# HANDBOOK OF ARCHITECTURE

Part II

## ARCHITECTURAL STYLES

Volume 1

## GREEKIAN ARCHITECTURE

By Josef Durm, Ph. D. D. Eng.

Building Councillor and Professor at the Polytechnic School in Ca

Third Edition

LEIPZIG

1910



Translated by N. Clifford Ricker, D. Arch.

Professor of Architecture

UNIVERSITY OF ILLINOIS

Volume VII.

1911

N. C. Ricker

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But the interest in antique art remains undiminished, its worth has not lessened, and not merely the upper ten thousand, but likewise the great mass of mankind always still overrunes its ideals, and its material worth has risen to the infinite.

What zeal and diligence in investigation has accomplished toward furthering a knowledge of the antique in Germany, England, France, Italy and not least in the mother country of the Greeks, as well as in youthful America in our own time, is and will remain a golden page in the history of art research.

In many things indeed must opinions be opposed, where secure bases have not yet been won; but this neither can nor should deceive us concerning the value of the labors. "The Greeks are and will continue as the polestar of all our endeavors and will never grow old like the ancients." (Schopenhauer).

To the architect trained in science and practice, to the archaeologist, to the historian of art and the cultured connoisseur, I present the extended work, that utilizes the latest results of research as much as possible. Here the judgement of other circles as well will be no less esteemed, according to the words of Aristotle, "that not in all matters is the exacting artist the sole and best judge."

Of that here given, by far the larger portion has been seen by myself, examined and drawn, whether on the fields of ruins or in the museums of our great cities.

Carlsruhe. November. 1909.

Joseph Durm.

## Preface.

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# THE ARCHITECTURE OF THE GREEKS BY JOSEPH DUBN.

## 1. Introduction and Historical Review.

"The deeper we penetrate into the history of the culture of antiquity, the more plainly do we see how much of this is to the credit of the culture of western Asia. And in the consideration of Grecian and Roman art may one observe how much of this highly elevated art recalls Egyptian and Assyrian prototypes.

The Greeks were intimately connected with the Phoenicians, the latter were settled nearer the Grecian lands, until they set foot in Europe itself, opposite Athens. And they also assumed the part of an intermediate between Egypt and Assyria on the one side and between the Greeks and Romans on the other.

As a final basis, we repeat that Grecian art goes back to Assyrian prototypes. Assyrian innovations first affected Egypt. And from Egypt they were brought to the Greeks by the mediation of the Phoenicians. The Phoenicians also received them directly from the Assyrians and also naturally transferred them directly to the Greeks."[1]

1. Babel-Bibel in den modernen Kunst by Heinrich Pudor. P. 67. Berlin. 1905.

But it will not be forgotten here, that the mutual acquaintance of the Egyptians and Assyrians, sword in hand, also without Phoenician mediation, may be dated back very far, and that in such contests a victor would appropriate so much from the other, as is shown by the art products of both nations.

Under Thothmes III (1597 B. C.) -- thus about 400 years before the Trojan war -- Egyptian armies were in Assyria, and in 1282 B. C. Ramses III again led his Egyptians northward to Asia Minor and eastward to the Tigris. The visit of the Egyptians in Mesopotamia was first retaliated by Cyrus' son Cambyses in 525 B. C., when they had already opened some of their harbors to foreigners (Greeks in Naucratis) 129 years earlier. Not trade alone causes travel, but likewise long and great wars and conquests do their part towards the transformation of art and art industry.

We should err in desiring to lessen the merit of the culture

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the valley of the Nile in favor of that of western Asia. In the improvement Egyptians and Assyrians took an equal part.

From a purely technical point of view, the subdivision into epochs of Greek monuments according to the use of available building materials, according to their peculiarities and degree of hardness, according to the mode and the possibility of working them, according to the working tools employed and the materials of which the latter were made, may be examined, enumerated and classified accordingly.

[illegible] the earlier period enclosed the rooms, stone and wood served to cover them, and from bronze and iron were the tools made, with which the workman prepared the different materials.

To bronze tools were the Greeks restricted for the buildings of the prehycenean and mycenean periods, and they appeared to these, as shown by the masons' marks and the stonecutters' on ones found in Mycenae and on Crete. Phaestos, Gnossos, Sunnia -- localities of the "intermediate isle of nations," where Italian work of excavation, British energy and liberality, and American zeal [1], have brought to light such astonishing results, -- Mycenae, Tiryns, Hissarlik (Troja - Ilion), Orchomenos and other places prove by their defensive walls, tombs, fortresses and palaces, that in these were the same technical processes employed, and that by perseverance and without being aspiring by the great tool, the most extended methods of dressing stone

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Walls of stone of varied hardness and of bricks already in the earlier period enclosed the rooms, stone and wood served to cover them, and from bronze and iron were the tools made, with which the workman prepared the different materials.

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*1. Duhn, F. von. Deautsche Rundschau. (Heft 12). Berlin. 1903. Also Milchhöfer, A. in the same. Berlin. 1902.*

*2. Handbuch der Architektur. Die Baukunst der Etrusker und*

*Römer. Chapter 1. Prefatory Remarks. P. 7 et seq. 2 d edition. Stuttgart. 1905.*

*3. Maspero found iron tools in the oldest pyrameds.*

We shall also not refuse to consider the art of setting these toilsomely wrought ashlars (Towers in Tyrins, walls at the Lions' Gate in Mycenae, the walls of tombs and doorway lintels there, with ashlars over 19.69 ft. long etc.), as well as the scaffolds of massive carpentry and the arrangements for hoisting, as well as the skill and perseverance in hoisting these colossal ashlars and bringing them to their places.

We might thus separate the structures of the bronze and the iron periods and so describe them, but it is still preferable to pursue the ancient course, to take up things according to their purposes.

Structures of ashlars wrought with "bronze tools," with large stones joined without mortar, or masonry of quarried stones of moderate size with earthy sand in the joints, the larger stones connected by wooden dovetails or those of bronze without cast lead, only serving to strengthen the bond, the so-called stonecutters' marks on the external surfaces of the ashlars, walls of airdried bricks with or without straw or chopped reeds and set perpendicular to the wall with imbedded wooden timbers parallel to the external surface of the wall, and an omission of fixed architectural members with corresponding ornaments, were characteristics of this first group. In it the clear architectural details were replaced by oriental and richly sculptured surface decorations of costly materials in varied colors; the buildings were protected by terrace roofs of clay, and the monumental covering of the openings and enclosed rooms occurred by corbelled courses of stones.

On the works of the "iron period" the surfaces of the ashlars were smoothed in various ways; their faces received simple dr drafts or special margins and angle drafts, both for polygonal and horizontal coursing. The dressed stones were strongly bonded, but were still set in courses without mortar and with the closest jointing; the end joints received a sinkink, except at their edges, headers and stretchers alternated properly, and for greater security, the stones were fastened together by iron

pins in the top and bottom with N, T, U or H-shaped iron cramps set in cast lead. The paneled marble ceiling replaced the wo wooden ceiling and finally gave place to a vaulted one; instead of the horizontal corbels appear the wedge-shaped cut voussoirs, and also burned bricks and lime mortar made airdried bricks and clay mortar impossible. Gable and shed roofs with clay and m marble tiles took the place of the terraced clay roof, the external surfaces of porous stone disappeared beneath plaster or stone slabs, and exposed places were in many cases covered and protected by brightly painted terra cotta slabs.

On the architectural members the relief and painted ornament appeared effectively; a fixed canon for architectural style with the aid of high relief, as well as monumental painting on the exteriors and interiors of buildings, makes itself apparent. The stonecutters' marks on the external surfaces of the stones vanished, but on the other hand occur on the hidden surfaces, the arrangements for raising the ashlars, which consisted of perforations, U-shaped grooves, rectangular projections, or straight holes in the beds in the oldest period, of lewis holes in the later ones. The final facing of the stones then took place after setting, as shown by the working marks and l lines on many walls, the various bosses (angle and edge ornaments) and the but partially cut flutes.

For the following works is assumed a subdivision according to definite periods; first that comprising the premycenaen and Mycenaen structures, then the porous architecture and the works until about 479 B.C., afterwards those of the classical period till 332 B. C., and lastly those of the Hellenistic-Roman period until 180 A. D.

Let us then consider in the domain of architecture the masterworks of Hellenic art transmitted to us, and we shall then meet therein with two predominating architectural styles, sharply separated during the best period, and which we designate by the names of Doric and Ionic.

As already stated, in these are contained architectural traditions from Egypt and inner Asia.

The forms came to Hellas developed to a certain degree, but there experienced that transformation, that is authenticated

as the highest degree of artistic perfection in the treatment of form in all times; "thus it bears the character of an organic necessity, that rises to a model, yet not in the dead sense, as if it were incapable of development and transformation."

Details of both styles indeed also occur on the same monument. Such a mixture may indeed be regarded as the harmless beginning of the decadent end.

From this mixing is indeed to be separated the well known u use of both orders, already fixed in details, on certain buildings, and which was never entirely excluded, even in the best period.(Propyleion in Athens, Temples in Phigaleia and Tegea, a temple in Paestum, the Philippeion at Olympia, the Tholos at Epidauros, etc., as well as Figs. 2, 3).

Not in the invention of new forms, but in the selection of those transmitted or introduced and in their inspiration does Grecian art employ itself. It could only in time and by steps of transition attain to that high perfection of form. Therefore we need not regard the perfected Hellenic art style as a direct development of that existing or invented earlier; it is far more the result of a new intellectual perception, that shaped from existing forms its own particular ones, whereby was also not excluded the realization of independent elements, native to the settled people.

The orders (the modern designation for the perfected separate styles of architecture) are the results of the same intellectual labor, that created the orderly separation in the varied mixture of traditional forms. From the ruins of earlier native and foreign elements have proceeded the formative art; we everywhere meet with the characteristics of their secondary origin.[1] Every people, that has neighbors more advanced in culture, will adopt from them and make their arrangements its own; an absolute originality cannot therefore occur for a less perfected or undeveloped culture, when one more fully perfected lies beside it. But the experience in all domains of art teaches, that imitation precedes originality, and that the latter first appears, when men still possess the power to create something from what is received -- the Hellenes had this power!

1. *Semper, G. Der Stil in den technischen und tektonischen*

Kunsten etc. 2 d ausg. München. 1880-1882.

The two traditions of Asia and Egypt were always favorite, before the models of adorning walls by the ancients. The countries mentioned were the Indians, they always were ornamented with great skills. The transmission of culture was by the Phoenicians, the people of Sidon and Tyre; Asia Minor and Persia were middle stations for traditions of Egypt and of Greece. 2

1. Life are in this sense. Ziehlfuer, L. Die Entwicklung der Kunst in Einzelnen. Minden. Fabricatelliu. N. 1-41. Leipzig. 1872.

Then not particular, like Fellas Tatens from the ideal of Jupiter, did the forms and orders of Hellenic architecture origin; their simplicity leaves were simply derived; the various architecture were to figures were subsequently formerly transformed, or have analogy elsewhere.

Since they are not actually original and also copying, similar never occurs, the severe forms of the Doric and the graceful ones of the Ionic styles of architecture have little to do with the character of the people. For example, the Spartans the classic Lager is transformations of the Doric order; in this each temple every art industry and manual work in character of Ionian; their architecture were luxurious imitations of the Indians Palaces; the forms of Persia and of Egypt were accepted as the most luxurious and extravagant idealistic ways of all nations. The use of Tyre, the ornaments of the Phoenicians with lions and sphinx monsters were assumed Persian and Babylonians. 3

3. Braun, J. Geschichte der Kunst etc. Wiesbaden. 1858-1858. 2 d ausg. by Reber. 1873.

Then was by the tissues of the Doric arts and the Ionic orders the individual symbols of Homer, for in the individuals are determined all of individuals -- clearly expressed the arts -- thus in Athens to that monarch in the cloak of a republican -- Pericles.

As in the case of my study of the Indians and Persians, the greater part was not solely such existence by, by origin, by the war and issues of the first nationality, or characters that are really expressed events, and equivalent also to Persian.

*Künsten etc. 2 d edit. Munich. 1860-1863.*

But the civilization of inner Asia and Egypt was already developed, before men thought of adorning Hellas by art works. The countries mentioned were not isolated, they shared their attainments with other peoples. The transmission of culture was by the Phoenicians, the people of Sidon and Tyre; Asia Minor formed the bridge between the civilization of Mesopotamia and of Greec. [2]

*2. Also see in this sense, Milchhöfer, A. Die Anfänge der Kunst in Griechenland. Studien. (introduction, p. 1-4). Leipzig. 1883.*

Thus not perfected, like Pallas Athene from the head of Jupiter, did the forms and orders of Hellenic architecture originate; their splendid fruits were slowly matured; the various t transition steps to ripeness were unfortunately frequently fragmentary, or have entirely disappeared.

Since they are not wholly original and since comparison almost never occurs, the severe forms of the Doric and the graceful ones of the Ionic styles of architecture have little to do with the character of the people. For example, the Spartans are usually taken as representative of the Doric race; by them were scorned every art industry and manual work as unworthy of a freeman; their architects were therefore foreigners or the subjugated Achaians, the Dorians of Corinth and of Syracuse w were accounted as the most luxurious and extravagant inhabitants of all Hellas. The men of Tiryns, the builders of the gigantic walls there and their successors were esteemed foolish and ridiculous. [3]

*3. Braun, J. Geschichte der Kunst etc. Wiesbaden. 1856-1858. 2 d edit. by Reber. 1873.*

Thus not to the demand of the people are due the most splendid architectural monuments of Greece, but to the intelligence and the determined will of individuals -- highly cultured rulers ~~as~~ thus in Athens to that monarch in the cloak of a republican -- Pericles.

As in the case of so many of the distinguished and great, the greater part was not called into existence by, but contrary to the wish and desire of the great multitude, an occurrence that also still happens hourly, and especially with us Germans.

spoke in his time of the man, who made Greece immortal. Howe-
ver, [illegible] and [illegible] of [illegible]
[illegible] by the [illegible] [illegible] of [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]
ral position of the arts, at least in the 2 d century A.D.
"The [illegible] of a [illegible] [illegible] [illegible]
ter. No young of noble nature has seen the Jupiter in Pisa
or the Juno in Argos and therefore desired to become a Phidias
or a Polycleus. Just as little does he wish to become an Ar-
[illegible], a Praxiteles or a Polycleus, because [illegible]
pleased him. 1

1. Compare the still more severe judgments in the 4 th cen-
tury B.C. in Aristotle's Politics. Book 8. "On Education." 2,
[illegible], 4 and 7.

More compulsory for the treatment of the architectonic forms
was and remains the nature of the building materials, then work
at the command of the people or of individuals for the encour-
agement of their architectonical ideas. Up to a certain degree, one
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
tors; these are the genius of the master and of his time on the
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
are [illegible].

2. See Essay in [illegible]. [illegible] [illegible]
[illegible]. [illegible]. [illegible]. 1871.

The form of an architectonical style is not compelled by the
climate of a country. The Ionic and Doric architectonical forms
sprung from the sunny and luxuriant soil of Asia, and transmit-
ted from the fruitful, but and rainless Egypt, stunk root and
produced flowers and rice fruits on the stony soil of Hellas,
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
the severer climate of a land, of a portion of which Hesiod
sings:- "Where bad is the winter and evil also is the summer,
and naught is good. Here is no longer the pleasing alternation
of the seasons of the year (as Herodotus says of the Ionian c
coasts); sheepskins, sewn with ox sinews, are thrown over the

Compare similar events in the golden age of the Renaissance.

"He gilded our city and decked it out like a vain woman; he squandered all the money and ruined the finances;" thus men spoke in his time of the man, who made Greece immortal. However highly the work was esteemed, and even if certain artists were honored by the personal friendship of elevated patrons, still a passage in Plutarch casts a peculiar light on the social position of the artist, at least in the 2 d century A.D. "The practice of a low business is equally opposed to the better. No youth of noble nature has seen the Jupiter in Pisa or the Juno in Argos and therefore desired to become a Phidias or a Polycletes. Just as little does he wish to become an Anacreon, a Philetas or an Archilochos, because their poems have pleased him. [1]

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More compulsory for the treatment of the architectural forms was and remains the nature of the building materials, that were at the command of the people or of individuals for the embodiment of their architectural ideas. Up to a certain degree, one may regard every architectural style as the product of two factors; these are the genius of the master and of his time on the one hand, and the quality of the materials supplied by nature on the other. [2]

*2. See Suess in Hauenschild. Katachismus der Baumaterialen. I Theil. P. 3. Vienna. 1879.*

The form of an architectural style is not compelled by the climate of a country. The Ionic and Doric architectural forms sprung from the sunny and luxuriant soil of Asia, and transmitted from the fruitful, hot and rainless Egypt, struck root and produced flowers and ripe fruits on the stony soil of Hellas, never characterized by luxuriant vegetation; they also survived the severer climate of a land, of a portion of which Hesiod sings:- "Where bad is the winter and evil also is the summer, and naught is good. Here is no longer the pleasing alternation of the seasons of the year (as Herodotus says of the Ionian c coasts); sheepskins, sewn with ox sinews, are thrown over the

shoulders against rain and snow, and a shaped felt is placed over the ears, that they may not drip. On the contrary in summer, the plough and sickle are used in entire nudity, and the glow of the dogstar dries up the marrow of men." Attica, with its but sparsely watered stony soil with a thin covering of earth, is also called by the poets the stony or rough.

The graceful filagree and perforated, often heaven aspiring and finely membered architecture of the Gothic style, with the roof gutters and intersections collecting an abundance of water and snow, is hard to bring into accord with our northern climate, and it awakens important reflections against the acceptance of a relation between architectural form and climate.

Porticos, loggias, balconies and bay windows are as native in the North as in the South; the bay window is a characteristic peculiarity of the Arabian and of the northern Gothic dwelling. [3]

3. *Ebers, G. Aegypten in Bild und Wort. (Street in Suez. II. P. 29. Street in Cairo. II. P. 108. Street in Copts' Quarter. I. P. 198.). Stuttgart & Leipzig. 1879-1880.*

Like its precursors, Grecian architecture became one in stone, and it is indeed a fact, that most Greek settlements were founded, where usuable building stone was abundant in the immediate vicinity; take only Mycenae, Athens with the limestone quarry of Lycabettos near at hand and the Pentelican quarries but a few hours distant, Syracuse, Akragas, Selinus, etc. But it c could only become a stone architecture by preliminary steps a and transitions, as also the case for its predecessors, those of Egypt and of Asia Minor, and indeed for like reasons.

Wood and mud (earth) are the earliest building materials in countries without stone, or at the time that men did not understand stonecutting, and textile fabrics, wood and metal received decorative architectural forms.

Evidence that wooden architecture preceded stone architecture is afforded by the rock-cut Tomb of Beni-hassan in Egypt, whose cornice imitates wooden construction. (Fig. 4).

For the buildings that served as prototypes of these tombs, men indeed only replaced the wooden columns by stone columns and left evidence of their origin, the cap form between the

support and the architrave.(Fig. 5).

Even at a greater time originally there the first architectural construction of wood was stone, in place of which wooden that entirely of stone.

In the ancient structures of Tyre and of Babylon is certainly of the original type of characteristics. Under walls of similar which carried by masts in by terrestial walls, according to the hand or the structure of building walls, characteristic them.

Tyre of Eros serve for carried as well as to carpenters the country, and a temple of Hercul and Astarte which wrought of the Babylon bricks from Ur. Among which are wonderful architrave with already built in the line of Tyre. Occupied the temple carried cedar carried by Hiram Tyre, and supported a timber roof covered with skins of animals.

The Tyre walls is of the temples of Tyre's Tyre and Palace, with the architecture was of stone for the architecture, and Tyre walls Babylon the colums (Tyre and Tyre) to be made of the Tyre's on account of the lack of stone, and which are about six times of height which are minutes six which, as well as the doors are brass.(Tyre in, Tyre).

The constructions of Rome and Athen are illustrate to show the ancient house of Tyre. [1] The Tyre is Athen Rome to Tyre, with Tyre the Babylon instruments - very minute in architecture, the cut entirely characters of the stone temples, mainly distinct internally and externally and architecture - in architecture with a temple which without there to this day in the buildings of Rome and Athen, but the parts of architecture cleared, while the rooms and internally were made of wood.

1. Tyre. E.R.S. Tyre, the ancient City, Tyre and Tyre. 1876.

Tyre's temples the architectural body of construction in Tyre, as it is stretched in Tyre Tyre temple, as Tyre this gives an example.

The inner stone column is fair which architectural construction of the original architecture, as Tyre the is a middle Tyre the ancient prototype of the Ionic stone column.

The Tyre's Tyre-Tyre temple architecture represent to stone a

support and the architrave.(Fig. 5).

Thus at a certain time originated there the mixed architectural construction of wood and stone, in place of which must appear that entirely of stone.

In the ancient structures of Susa and of Babylon is contained the original type of Asian architecture. Thick walls of airdried bricks covered by vaults or by terraced roofs, according to the lack or the abundance of building woods, characterize them.

Trunks of trees served for covering as well as to strengthen the masonry, and a facing of burned and glazed bricks protected the airdried bricks from decay. Tunnel vaults and domes on pendentives were already built in the time of Darius. Cuneiform texts mention cedar posts decorated by gold leaves, that supported a timber roof covered with skins of animals.

The Bible tells us of the carpentry of Solomon's Temple and Palace, with the contemporary use of stone for the substructures, and Strabo permits in Babylon the columns (beams and posts) to be made of palm trunks on account of the lack of stone, and these were wound with ropes of twisted straw and painted with colors, as well as the doors with asphaltum.(Book 16, Chap.1).

The combination of wood and stone can likewise be shown on the ancient tombs of Cyprus. [1] The Temple at Agios Photius on Cyprus, built before the Hellenic influence - very simple in architecture, the cell entirely constructed of unburnt bricks, thickly plastered internally and externally and whitewashed - in accordance with a custom still retained there to this day in the building of halls and porticos, had the shafts of columns of wood, while the bases and capitals were made of stone.

*1. Cesnola, L.P.D. Cyprus, its ancient Cities, Tombs and Temples. 1879.*

Likewise compare the traditional mode of construction in Lycia, as it is preserved in that flat country, of which Fig. 5 gives an example.

The later stone columns in Asia Minor incontestable indicate woods as the original material, and they are in a certain sense the archaic prototype of the Ionic stone column.

The Lycian rock-cut tombs accurately reproduce an ancient w

wooden house, from which was developed a stone monumental structure under changed conditions, while on the Persian monuments greater freedom occurs,for all ornament is suppressed on the latter, that recalled too strongly the abandoned wooden construction.

Where nations in communication with Egypt and Asia received their civilization from the former and columns came into use in architecture, the "slender columns" are to be referred to Asian and the "thick columns" to Egyptian origin.

Close and wide spacing depend on the style, the nature and the resistance of the architrave beam lying thereon.

We learn from the poems of Homer, that enclosing walls and partition walls were made of stone and were covered by wood, metal and tapestries. The roof consisted of beams with a layer of earth, when the ceiling beams were of lighter wood and were supported by girders resting on posts.

The development, climax and decadence of political and artistic life may have proceeded as illustrated in the following summary.

After the Trojan war occurred in Hellas still frequent changes of sites and foundations, so that the country could not yet develop in peace and prosperity.

The long absence of the princes and warlike men during the trojan war from their household hearths afforded to aspirants remaining at home abundant opportunities to create complications of all kinds, that required solution by the sword. Transfer of possessions, emigrations and immigrations followed the bloody dramas; thus in the "eightieth year" after the fall of Ilion, the Dorians in league with the Heraclides took possession of the Peleponessus.

The most fruitful regions of Thessaly, Boetia and a part of the Peloponnessus most generally changed their inhabitants, and Hellas only painfully attained to quiet and orderly conditions, which were first enjoyed by Attica,in particular. On account of its small area, this country chiefly remained from the earliest time free from changes, and the Athenians proudly called themselves aborigines or natives, the oldest people, that alone among all Hellenes had not changed its dwelling

place." Thucydides sees in this a basis for the high culture of Athens in comparison with the other states. Important men appeared in various states as lawgivers, arranged public occurrences, and after quiet conditions obtained, prosperity increased. Men built fleets, sent out colonies, and thus the Athenians populated the Ionic domain and most of the islands, but the Peloponessians occupied Italy and Sicily.(See Thucydides). The stream of the peoples, that originally flowed from East to West again in part returned eastward; moreover the Trojan war may already be regarded as an unsuccessful colonizing expedition toward the East.

Also about this time the names of "Hellas" and of "Hellenes" may have been assumed for the entire fatherland and the peoples allied by origin, since the epic poets living after the Trojan war still employed Danaids, Argives and Achaians as a general appellation.

It was likewise the Athenians, who first adopted a more comfortable mode of life, and dropped the barbaric custom of bearing weapons, caused by the insecurity of former conditions. As an expression of the national fellowship were founded the Olympian games in 776 B.C.:- in 670, we find Grecian colonists and mercenary soldiers in Egypt; about 600, Grecian colonies extended from the Black Sea even to the western Mediterranean. Likewise the northern coast of Africa received a Grecian colony in the founding of Cyrene by Battos from Thera.(631 B.C.).

These colonies were not mere trading stations, as with the Phoenicians; they were to be the means of providing new and b better locations for an increasing population in the mother country.

In Asia Minor, the Aeolic, Ionic and Doric colonies soon excelled the fatherland in the culture and care of the fine arts and even exerted an important influence upon it. The twelve cities of Miletus, Myus, Priene (in Caria), Ephesus, Colophon, Lebedos, Teos, Erythea, Clazomenea and Phocea (in Lydia), the island cities of Samos and Chios attained wealth, culture and importance, aroused the envy of the princes of Lydia (617-504 B.C.), otherwise not well inclined toward the Hellenic races, and these finally became tributary to them. By resistance to

them, Miletus lost its Temple of Athena, but received for it two new ones built by Alyattes. The rich and art-loving Croesus sent to Ephesus golden cows as consecrated gifts together with many columns of the Temple, he sent to Delphi 117 golden half bricks, on which was represented a golden lion, a silver and a gold mixing vase, the first of these holding 600 amphoras (5400 gallons ?), 4 silver vessels, silver and gold sprinkling vessels, silver castings and a golden female figure 3 ells high, to the Temple of the Ismenian Apollo at Thebes the golden weapons dedicated to Amphiauros (which Herodotus still saw), and he sent to the Spartans gold for the figure of Apollo on the Thornax in Laconia.

After the fall of the Lydian empire, the easy yoke of the Lydians was succeeded by that of the Persians under Cyrus. The cities of Magnesia and Priene were sacked by Mazares, Phocea was taken in spite of its walls, excellently constructed of great stones. Under the successor and under the rule of Darius occurred a rebellion of the Ismenians, projected by the Milesian Aristagoras and with the aid of Athens, in which Sardis was laid in ashes, the seat of the satrap Artaphernes and the former residence city of Croesus, whose houses were frequently merely constructed of reeds, or were of airdried bricks with roofs of reeds. A Temple of Cybele was thus destroyed, which occurrence later served the Persians as a pretext and excuse for destroying the Grecian sanctuaries. Miletus was reconquered by the Persians, and then the Sanctuary in Didyma with the Temple and Oracle were plundered and burned. The Persians armed for a campaign of revenge toward Athens, which had meantime taken a splendid course of development under the rule of the art-loving Pisastratides. The market-place was laid out, the acropolis was adorned by magnificent buildings, and the g great Temple of Zeus commenced (538-510 B.C.). Smaller contests of the Hellenic states with each other in this time were not obstructivv to the progressive arts and sciences.

Under the guidance of banished Hellenes in 490 B.C., the Persians invaded Hellas, devastating the province of Eretria in retaliation for the fate of Sardis, plundering and burning temples, until they were beaten on the plain of Marathon and com-

[illegible] the year [illegible]. [illegible] the year [illegible] [illegible] [illegible]

compelled to retreat. Attica was saved at first. Ten years later, Xerxes passed the Hellespont into Europe with an imposing army, first conquered all Phocis, burned villages, set fire to cities and overthrew temples; the rich Temple of Apollo at Abea with its rich treasuries and consecrated gifts was then destroyed.

At Panopeus the army divided into two forces; the larger continued with the king to Athens; the other portion passed to the road of Delphi, laying in ashes the cities of Panopeus, Daulis and Aeolida; Delphi itself escaped destruction and plundering, apparently by a miracle and the action of the elements. With lightning and thunder, rocks were torn loose from Parnassus at the approach of the barbarians, rolling down upon themstorming hordes, who were terrified and amazed, fleeing from the wrath of the deity!

Thespia and Plateia were burned, the abandoned lower city of Athens was destroyed, the temples plundered, and the sanctuaries in the citadel were destroyed by fire. "After the departure of the Persians, very little of the enclosing walls were standing; the houses were destroyed, except a few, in which important Persians resided." The day of Salamis (480) put an end to this destruction; a year later and after a bloody overthrow near Platea (479), the remains of the Asian invasion left Hellenic soil. On the same day as at Salamis, the attack of the Carthaginians on the Grecian colonies of Sicily was chushed; Gelon destroyed near Himera the African army.

No abundant material in architectural works remains for us from this period until the oldest stone temples on Hellenic a and Italian soil; many gaps before the masterworks of the 6 th century are to be mentioned. Even if the excavations in Mycenae and Tiryns, in Troy and Olympia, have extended our knowledge of the entire species of buildings of the early period, we are not in condition to correctly givv on all their parts the construction and arrangements of the houses of the gods in the e early period. And if we base hypotheses on the drums of columns, the substructure and the few remaining ashlar courses of the Heraion in Olympia, whose purport extends even to the 9 th and 10 th centuries B.C., no positive image results.

In contrast to the arrangements of the splendor-loving and rich Asians, the public and private buildings of the Hellenes may have been still simple at about the time of the battle of Platea. Pausanias, the general, was amazed by the tent of his adversary, decorated by gold and silver, the couch covered with gold and silver, the golden mixing vessel and cups, by the sa sacks filled with silver and gold cups, the table of gold and silver, and all the splendor of the feast. Therefore he ordered the preparation of a Spartan meal, called the leaders to h him and addressed them:- "Ye Hellenes, I have caused you to be assembled, since I desired to show you the folly of the Median commander, who led such a splendid life and yet came to us, in order to deprive usof this poverty, in which we live." -- The simplicity of the dwellings was peeviously referred to; t then one must not forget, that the Hellenes were a free people, jealous and mistrustful to the extreme, inclined to criticism, and economical with money. No citizen dared to make public his prosperity, in order to not arouse democratic feeling by visible luxury, which might at best have produced envy and evil suspicions. Alcibiades first had his house painted internally.

The Greeks did not have at command the treasures and slave hands of the Egyptian and Persian kings; they had no multitudes for willing service in the erection of their works - they sought to win excellence by beauty and choice in form, that one must find in their works. Thus they avoided in their buildings the multitude of architectural motives, an overloading with ornaments, a heaping of amazing details; in the temples, public buildings and dwellings, simplicity is the supreme law. The workmen were proud of their work and regarded it with consciousness. To this fact, which indeed sometimes increases beyond sufferance, it is due, that most Grecian works exhibit such faultless execution.[1]

*1. Viollet-le-Duc. Histoire de l'Habatation Humaine etc. P Paris. 1875.*

Religious feeling and belief were firml: rooted in the people before and during the best period, even if the cultured rulers might think more freely of the world of the gods interwoven with all the defects and preferences of the character of

the Hellenic people. The belief of the people in a deity, the overlooking of this made it possible for the Pisistratides to erected in Athens an Iseion. "A marble from the island of Paros and of such great size, nearly 4 ells in height and of beautiful form" was completely armed and placed in a chariot, that the Pisistratides followed with their adherents; behind them carried as Pallas Athena, with Pisistratus and Ionas behind them, the typically maidenly, proper to her - and the almost rococo.

What part in the worship of the gods played the Hellenic mind in the Ionic-Doric era, that is especially simply not be described. Traffic with women within the sanctuary was not permitted, nor even for them to visit it while unpurified. Hypatrans and Heliaeas here applied the same laws, while nearly all other parts of the world then known to men permitted the same freedom in the houses of the gods and within the sacred enclosure as to animals. 2

2. See Herodotus.

In the Ionic Age, the temples of Apollo and Artemis became ruins, yet their priests on earth were somewhat more pious. The Alkmaonides, who fled from the Pisistratides, built the facade of the Temple in Delphi of Parian stone instead of tufa, as afraid so, in order to be able to make an impression, and by increased expense, they attained their end; even Peisistratus and Pericles, who carried through the Parthenon, made to gain - the oracle overawed the Athenians rather than encouraged them to fight for freedom. The priestess of the god for the good reason certain distinction the Delphic priests even the increased Persian attack.

From the barrenness of its mythology, the Hellenic people in the early days of the Ionic Age, and in the Doric Age, was also without the light of Ionia, after the Persians had a different people.

Deities certainly improved, and particularly Zeus, who appeared at the head of the Hellenic states, showed by the epithets of his each-case particular divinity, that the need to realize over the ancient Pelasgian gods Zeus Pelasgicus. The Hellenized Pelasgians, "the Cyprians," assumed the worship

the Hellenic people. The belief of the people in a deity, the overlooking of this made it possible for the Pisastratides to execute an attack on Athens. "A woman from the region of Paena and of such great size, nearly 4 ells in height and of beautiful form"was completely armed and placed in a chariot, that t the Pisastratides followed with their adherents; heralds announced her as Pallas Athene, whom Pisastratos was taking back into her city; the people believed, prayed to her - and the attempt succeeded.

Great care in the service of the gods busied the Hellenes; it was then strongly held, that the sanctuary should not be desecrated. Traffic with women within the sanctuary was not permitted, nor even for them to visit it while unpurified.Egyptians and Hellenes here applied the same laws, while nearly all other parts of the world then known to men permitted the same freedom in the houses of the gods and within the sacred enclosure as to animals. [2]

*2. See Herodotus.*

If the gods were also conceived to be just and perfect beings, yet their priests on earth were somewhat more pliant. The Alkmaonides, who fled from the Pisastratides, built the facade of the Temple in Delphi of Parian stone instead of tufa, as agreed on, in order to win the oracle to their purpose, and by increased expense, they attained their end; even Persian gold was not scorned, and the national concern was subordinated to gain - the oracle overawed the Athenians rather than encouraged them to fight for freedom. The gratitude of the king for the good service perhaps protected the Delphic priests more than the reported doubtful attack.and miracle.

Freed from distress by the barbarians, the Hellenic people in the mother country and the colonies recovered, and arts and sciences under the lead of highly gifted statesmen took a flight never equaled.

Conditions certainly improved, and particularly Athens, that appeared at the head of the Hellenic states, showed by the sp splendor of its successive public buildings, that its much va vaunted power and its ancient prosperity were not falsehoods. The highminded Pericles, "the Olympian," assumed the control

supplied with all needs for a war. Therefore he believed that

ir completion should as strongly win eternal fame, as the

metal, ivory, gold, ebony and cypress wood. Lumberman were so

found the trades required for their preservation and use, since

and then the laborers for the transportation and conveyance of

all this:- pilots, sailors and steersmen for the sea, for the

saddlers, roadbuilders and miners. Finally were assigned to

each trade a multitude of lay helpers, to take the place of

were tools and to give their bodies to the service. At such

iron prosperity over every age and every capacity.

The works gradually arose, splendid in their magnitude or

ly earned the greatest surprise. Things that men believed

ted within the time of a single government.

it is yet fresh and unmarred until today. So strongly does a

certain bloom of eternal youth rest thereon and protect the en-

ces over classical. The Pantheon, built by Hadrian and Salluste-

cities, the Tunnel of the Emperors at Tivoli, constructed by Cir-

codes and finished by Narcyzes and Jlaviyes, the Lake Fucil at

Caliphates, the Odyssey, some mineral fire and or tempering

of the east of the Persian King, and the Procyplion built by

of Attic state affairs; money was sufficient and the city was supplied with all needs for a war. Therefore he believed that he should employ the surplus means for objects, that after their completion should as strongly win eternal fame, as that they should be a source of prosperity during their erection.

Thus without delay, he placed great designs in execution and artistic plans for works of longer duration before the people. As Plutarch states, the building materials were at hand - stone, metal, ivory, gold, ebony and cypress wood. Likewise were fo found the trades required for their preparation and use, since there were:- carpenters, sculptors, smiths, stonecutters, dyers, workers in gold and ivory, painters, embroiderers, carvers, and then the laborers for the transportation and conveyance of all this:- pilots, sailors and steersmen for the sea, for the land teamsters, horseboys, drivers, ropemakers, linen weavers, saddlers, roadbuilders and miners. Finally were assigned to each trade a multitude of lay helpers, to take the place of mere tools and to give their bodies to the service. At such a locality all these requirements extended and scattered a rich prosperity over every age and every capacity.

The works gradually arose, splendid in their magnitude or inimitable by their form and beauty. All masters strove to e excel in manual work by successful execution. Yet the rapidity earned the greatest surprise. Things that men believed that each one would only be completed with toil for many generations and ages of men - these things were completely executed within the time of a single government.

In beauty each work from the beginning attained to the prototypes of antiquity, while by its refined and blooming charm it is yet fresh and animated until today. So strongly does a certain bloom of eternal youth rest thereon and protect the entire appearance from every effect of time. It is as if a breath of eternal spring had touched these works - a spring that can never change! The Parthenon, built by Ictinos and Callicrates, the Temple of the Mysteries at Eleusis, commenced by Corcebos and finished by Metagenes and Xenocles, the Long Wall of Callicrates, the Odeion, whose external form was in imitation of the tent of the Persian king, and the Propyleion built by

friend of the "Olympian", created the golden statue of the [illegible] of Alkmene a great deity, who as the lawgiver and [illegible] the entire world. Power and wealth enough fires of all save the [illegible] the last 30 years before the Peloponnesian war at least 8000 talents in the small state of Athens, thus more than ten mil- lions of dollars. "But if these sums had not been spent in creating perfect works, when all the elements existed, - this moment could have never returned."

[illegible] colonies planted a new and active life. Strong cultivated [illegible] carried on with great zeal the temples began under the tyrants [illegible] are [illegible] Greece, Asia Minor, Italy and Sicily [illegible] ated between 450 and 430; the oldest temple in Selinus perhaps [illegible] -- in the most beautiful city of mortals." The Italian colonies, in the temples at Paestum and in the temple ruins at Locri ex- hibit splendid proofs of their activity in art.

[illegible] Asia Minor, Africa, Spain, and on the islands. The [illegible] Persians, the Persian, the Armenians at Ararat. [illegible] Persian war, and only the Temple of Diana was rebuilt after the Persian war as a monument of importance; the Temples in Sardis, Priene, Magnesia, Tralles, etc. are referred to the 4 th century B.C. and even later times. What remains to

Mnesicles, are works of this period. The great Phidias, the friend of the "Olympian", created the golden statue of the goddess and supervised all the undertakings; the latter had m made of Athens a great city, one of the largest and richest; by this it became the school of culture in Hellas, indeed of the entire world. Power and wealth should first of all serve art; for works of architecture and sculpture were expended in the last 20 years before the Peloponnessian war at least 8000 talents in the small state of Athens, thus more than ten, millions of dallars. "But if these sums had not then been spent in producing perfect works, when all the elements existed, - this moment would have never returned."

But not merely in the mother country, yet likewise in the colonies pulsated a new and active life. Sicily cultivated architecture first of all during the time from the fall of the tyrants until the second invasion of the Carthaginians. Men carried on with great zeal the temples begun under the tyrants and undertook yet greater and more beautiful ones, corresponding to the advanced art culture. A great part of the temples and aqueducts at Syracuse, Akragas, Selinus and Himera originated between 480 and 450; the oldest temple in Selinus perhaps already before 600, the latest in Egesta shortly before the invasion of the Carthaginians in 410 (if Holm be incorrect in t the possibility of its erection shortly before the destruction by Agathocles in 307). Among these the Temples of Olympian Z Zeus at Selinus and Akragas belong with the greatest in antiquity; both were never completed and never surpassed in magnitude only by the Artemesion in Ephesus. "They built as if they would live forever, and ate as if they would die on the morrow -- in the most beautiful city of mortals." The Italian colonies, in the temples at Paestum and in the temple ruins at Locri exhibit splendid proofs of their activity in art.

More sparing are the stone tokens of the blossoming on the soil of Asia Minor, affected by wars, and on the islands. The national sanctuary of the Ionians, the Artemesion at Ephesus, was spared by the Persians, and only the Temple of Miletus was rebuilt after the Persian war as a monument of importance; the Temples in Sardis, Priene, Magnesia, Teos etc. are referred to the 4 th century B.C. and even later times. What remains to

us of all this splendor? -- Considerable for the length of time, that has passed since the time of Pericles until our day, and yet too little to afford a sufficient representation of an antique temple with all its peculiarities. If likewise the plans of the different monuments are determined by repeated measurements, the forms of the details made known by drawings of all kinds, there are yet wanting to us certain structural arrangements, the ceiling of the cell and the construction of the roof of the temple, the desirable starting points on the works. Concerning these arrangements opinions are very much divided and must so remain, until a fortunate discovery places in our hands more perceptible materials. Whether this case may ever occur in the present condition of the known monuments must be very doubtful. Even the soil of Olympia gave no answer to the questions of this kind.

The various attempts to restore antique temples to their original form, or the dimensions of all kinds of temples, the l lighting, construction of roofs and ceilings of temples, are and continue to be chiefly more or less ingenious hypotheses. Under these circumstances, the facts longest known require no special confirmation, that our acquaintance with Grecian architecture is always limited; also the most thorough revision of all illustrations (we have indeed done this fully) and the most accurate research in breadth do not fill the gap. To numerous publications of details in the modern period, we indeed o owe conclusions on the present condition of the monuments, that truth of statement has taught how to distinguish between so m many notable publications and has improved defective details; but they give us no information concerning that irrecoverably lost. Not even the dates of erection of most monuments are known and attested to us, and we must here also be frequently satisfied with "about."

The best preserved Doric monuments are the "Theseion" and the Parthenon in Athens, built of marble, with the so-called Temple of Concordia in Akragas, constructed of limestone, and which afford definite conclusions relating to the arrangement and construction of the external architectural members and the ceilings of the porticos; the so-called Temple of Poseidon

in Paestum, that presents a representation of the interior; t the arrangement in 3 aisles, the small columns above others, only leaving open the questions of the ceiling and of lighting. Nearly all other monuments have fallen a sacrifice to the power of the elements and man's love of destruction, and merely remain only in more or less doubtful ruins. For this material reference is made to the following Sections.

Pestilence and war, foreign and internal commerce of the different states, the mysterious conflict between Athens and Sparta, that continued nearly 30 years (431-404 B.C.) with varying fortunes, ended with the downfall of Athens and consumed the marrow of all Greece, reduced the means and the taste for monumental art; the people, that had previously undertaken the highest things became "loquacious and avaricious, corrupt and cowardly;" its freedom was buried on the day of Cheronea(338). In the dazzling appearance of an Alexander (336-323) Grecian genius afterwards flared up and indeed produced on Asian soil art works of importance and elevated beauty, but the chaste fragrance and the pure charm of the products of the age of Pericles were lacking in them. Under the patronage of the tyrants (405-365) in Sicily, there continued to bloom the arts and sciences in different places; the noble Timoleon created orderly conditions (344) favorable to architecture; but the people no longer possessed energy and passed under the rule of foreigners. In the year 264 the Romans took possession of Sicily.

In place of Athens, Alexandria (323) became the centre of Grecian literature and art; under the vain and splendor-loving but artistic princes of Pergamon, Grecian art lived through a later blossoming, convincing evidence of which is afforded by the finds deposited in the museums of the capital of the German empire.(Best period 241-138). Hellas came under Roman rule in 196; the political and the artistic power of origination of the people were thereby destroyed. The culture cities of art, Corinth (146) and Athens (86) were taken by storm and destroyed, Asia Minor (64) was declared a Roman province, the art works of Greece wandered as booty to eternal Rome.

Fulvius Nobilior carried away 785 bronze and 230 marble stat-

1. Earliest Time to Persian Wars.

776. Commencement of the Olympiads.

734. Founding of Syracuse by Corinthians.

707. Founding of Tarentum by Spartans.

560. Pisistratus, tyrant of Athens.

Greeian colonies in Asia Minor become subject to the Persians.

2. From the Persian Wars to the Death of Pericles.

480. Third campaign. (Battle of Salamis).

statues from Aetolia and Acarnania; Aemilius Paulus employed in his triumphal campaign 250 wagons for the plundered statues and paintings; Sulla even removed single columns of the Olympeion from Athens to Rome.

These art treasures and the Grecian captives interned in Rome and among Italian landscapes afforded the next opportunity for the spread of the Grecian art style into foreign lands.

"Still conquered Hellas again subdued the wild victors and brought art to Latium."

By Hadrian's favor in 117-138 A.D., Athens and the cities of Asia Minor acquired a new but transitory splendor, to then pass into oblivion, to lend again to the art of the modern period clarifying and rejuvenating energy after the excesses of the 17 th and 18 th centuries.

CHRONOLOGICAL TABLE. [1]

*1. See Chronologisches Uebersicht V. P. 53 and Zur Geschichte der Griechischen Kunst Vi. P. 61 et seq., recently edited by Professor R. Kekule, by Dr. R. Zahn in K. Baedeker's "Griechenland." 4 th edit. Leipzig. 1904.*

1. Earliest Time to Persian Wars.

B.C. 2000. Pelasgians are the earliest inhabitants of Greece.

1500. Aeolians, Ionians, Dorians (Hellenes).

1194-1184. Trojan war.

1104. Dorians under Heraclides occupy the Peloponnessus.

1000. Aeolic, Ionic and Doric colonies on the coast of As Asia Minor. Asia Minor.

776. Commencement of the Olympiads.

734. Founding of Syracuse by Corinthians.

707. Founding of Tarentum by Spartans.

560. Pisastrates, tyrant of Athens.
Grecian colonies in Asia Minor become subject to the Persians.

510. Reform of constitution in Athens by the Alcmaeonide Cleisthenes.

2. From the Persian Wars to the Death of Pericles.

492. First campaign of Persians against Greece.

490. Second campaign. (Battle of Marathon).

480. Third campaign. (Battle of Salamis).

477. Piracy of Athens.

[illegible]. [illegible]. Conquest of [illegible].

480-478. Campaign of Athenians against Egypt.

[illegible]. Age of Pericles. (Philosophers, Painters, Sculptors, Poets, Sophists, Socrates, Thucydides.

[illegible]. Philosophers and (Pre-Socratics, Parmenides, Heraclitus, Anaxagoras, Anaxarchus, Protagoras, Socrates.

480-429. Peerlessness in Athens. Death of Pericles.

B. From Pericles to Alexander the Great.

[illegible]. Spartan supremacy in Aegean Sea; Lysander.

404. Death of Alcibiades.

[illegible]. Career of Philippus (Macedonia and Philippics.

Death of Socrates.

374. Supremacy of Thebes.

[illegible]. Pelopidas, Death of Epaminondas.

4. From Alexander the Great to the Reconquestion of Jerusalem.

338. Alexander, King of Macedonia. (Aristotle, Diogenes, Epicurus, Zeno, Stoics, Epicureans, Sceptics.

334. Alexander in Asia.

327. Alexander's campaign toward India.

323. Beginning of the war of the Diadochides.

307-270. Philosophen, "the last of the Greeks."

146. Conquestion of Corinth. Greece conquered with Macedonia in a Roman province.

[illegible]. Jesus Christ and Christian era, also [illegible] of the Caesars.

56. Athens taken by Sulla.

117-138 A.D. Hadrian's buildings in Athens and other parts of Greece.

[illegible]. Christian Church in Constantinople of Greek.

[illegible]. Greece in Ruins.

[illegible]. Constantinople the Greek. Turkey is Christianity.

393. Olympic games cease.

[illegible]. Rome Destroy Athens, Sparta, Thebes and the cities the Peloponnesus.

267-277. Invasion of the Vandals.

[illegible]. School of Philosophy in Athens is closed.

477. Primacy of Athens.
465. Cimon. Conquest of Chersonesus.
460-456. Campaign of Athenians against Egypt.
445. Age of Pericles.(Polygnotus, Pheidias, Ictinos, Mnesicles, Sophocles, Herodotus.
431-404. Peloponnessian war.(Thucydides, Euripides, Aristophanes, Hippocrates, Polycletus, Socrates.
430-429. Pestilence in Athens. Death of Pericles.

3. From pericles to Alexander the Great.

415. Sicilian expedition of Athenians under Alcibiades.
404. Death of Alcibiades.
404. Climax of painting under Zeuxis and Parrhastos. Death of Socrates.
374. Supremacy of Thebes.
359. Sculptor Praxiteles. Death of Demosthenes.

4. From alexander the Great to the destruction of Corinth.

336. Alexander, king of Macedonia.(Aristotle, Diogenes, the sculptor Lysippus, the painters Apelles and Protagenes.
334. Alexander in Asia.
327. Alexander's campaign toward India.
323. Beginning of the war of the Diadochides.
287-275. Philopömen, "the last of the Greeks."
146. Destruction of Corinth. Greece combined with Macedonia in a Roman province.

5. Greece under Roman and Byzantine rule, also under the Osmans.

86. Athens taken by Sulla.
117-138 A.D. Hadrian's buildings in Athens and other parts of Greece.
170. Pausanias issues his description of Greece.
260-268. Goths in Attica.
323-337. Constantine the Great. Victory of Christianity.
393. Olympic games cease.
395. Goths destroy Eleusis, enter Athens and lay waste the Peloponnessus.
467-477. Invasion of the Vandals.
529. School of Philosophy in Athens is closed.

[illegible] Venetians and overtaken in Naxos already in Frankish possession.

1204. Otto de la Roche, ruler of Athens.

1294. Bartolo Acciajuoli, Duke of Athens.

1456-1459. Conquest of the Morea by the Venetians.

1827. Or Sept. 26, about 7 P. M., destruction of the Parthenon by a shell directed by a Bunsberg lieutenant under Königsmark and Morosini.

During six and essentially Architecture, modern tools are to be equals in Asiatic and Europe. The two distinct civilizations of Athens, activity in the commercial world the same structural principle as the equilibrium in the lower and architecture.

Yet it first be perceived in relation to the dwellings of the poor of both countries, that as these were made of the materials, the clay layers of the Nile, first pulses between the quarries and figure and of the sacred Nile stream, which matter freely offered to the primitive inhabitants, and which received the lines into in preparation for building purposes. Of military [illegible] trial in the sun, where also supplied stone or marble, were formed the external walls, and the dwellings were of [illegible] and clay or of some [illegible] of stone. Where wood for a building was obtained with difficulty, trees appeared instead of the Nile [illegible], the [illegible] walls of [illegible] stones or of bricks.[1]

1. See representations of such houses in "Voyage et Ancient" by Victor Place. Pl. 41, after Luynes, Pl. 17. Paris. 1867.

Such of a [illegible] stone [illegible] large [illegible] the [illegible] in [illegible] small materials were the [illegible] [illegible] and in the construction of the very regal palace, masonry was needed in view in their walls a greater [illegible] to injuries of the weather by facing them with burned [illegible] brick, and very elaborate [illegible] in [illegible] the [illegible]. It is to be noticed in his [illegible] nature of the building materials, that these colossal monuments of the ancient world were left remarkably on the positions of their [illegible] activity in architecture. Wherever there [illegible] a few weeks in order [illegible] the lower terraces of the site [illegible] by walls in a [illegible] (Memorial [illegible] - [illegible] 1). In Egypt the [illegible] and

746. Pestilence and extension of Slavic elements in Peloponnessus.
1204. Otho de la Roche, ruler of Athens.
1394. Rainiero Accajuoli, Duke of Athens.
1685-1699. Conquest of the Morea by the Venetians.
1687. On Sept. 26, about 7 P. M., destruction of the Parthenon by a shell directed by a Luneberg lieutenant under Königsmark and Morosini.

Grecian art and especially architecture, whose roots are to be sought in Assyria and Egypt, the two oldest civilized s states, exhibits in its monumental works the same structural principle as the buildings in the lands just mentioned.

Let it first be perceived in relation to the dwellings of t the poor of both countries, that as these were made of the materials, the clay layers of the great river bottom between the Euphrates and Tigris and of the sacred Nile stream, which nature freely offered to the primitive inhabitants, and which required the least care in preparation for building purposes. Of moulded bricks dried in the air, mixed with chopped straw or reeds, were formed the external walls, and the ceilings were of reeds and clay or of rough trunks of trees. Where wood for b building was obtained with difficulty, there appeared instead of the beam ceiling, the stone ceiling made of small natural stones or of bricks.[1]

*1. See representations of such houses in "Nineve et Assyrie" by Victor Place. Pl. 41, after Layard, Pl. 17. Paris. 1867.*

Want of a natural stone breaking into large pieces caused t the Assyrians to continue to use small materials even for their public buildings and in the construction of the vast royal palace, whereby they sought to give to their walls a greater resistance to injuries of the weather by facing them with burned and glazed bricks, and they employed asphaltum in setting the courses. It is to be ascribed to the defective nature of the building materials, that those colossal empires of the ancient world have left behind relatively so few vestiges of their activity in architecture. Rubbish heaps [2] a few yards in height conceal the lower courses of the city surrounded by walls in a rectangle (measuring 5906 × 5313 ft. in length and breadth) and

of the Palace of Khorsabad (completed 706 B.C.[3]), with the costly glazed tile facings of different colors, the colossal winged guardians at the entrance portals, with the bodies of bulls and the bearded human heads. Mighty arches and tunnel vaults of voussoirs, vaulted living rooms and sewers exhibit to us the matured system of a monumental covering of the apartments, where natural stone was lacking.

*2. See Victor Place, Pl. 8, 9, 20 and others.*

*3. See Victor Place, Pl. 2.*

The conditions were otherwise in the land of Egypt, where in addition to the beds of clay, soft and the hardest stones were at command for building purposes of every kind, and from which stone beams and slabs 29.53 ft. in length could be obtained a and employed for covering the halls of temples. [4] Walls were solid or furnished with windows and doorways, detached supports shaped as piers or columns, the protecting ceiling or roof -- these were the elements of architecture in the earliest period, that have remained the same until our time. Merely the external appearance experienced a change in time, but the nature remained the same.

*See Denkmäler aus Egypten und Aethiopen by C. R. Lepsius. I. Abth. Pl. 78. Great Temple of Karnak. Blatt 1. Berlin.*

In Egyptian stone construction attention is paid only to direct or relative resistance of the material, there being in safe construction only one force, the vertical pressure. [5]

*5. See representation of the system in Perrot & Chipiez' L' Egypte, Vol. 1. Fig. 78.*

It is otherwise in Assyrian masonry construction, in which on account of the pressure a side thrust occurs. The forces acting here are therefore of two kinds; pressure and thrust. For the stability of these buildings must be provided arrangements, that directly or indirectly neutralize the thrust. The noble simplicity of form and construction in the Egyptian style of architecture must in the Assyrian give place to a more complete system, which in consequence has become the one predominating in the world, by which the highest problems of architecture may be solved -- the spanning of the most colossal interiors without intermediate supports!

An area single accordingly of structural genius of the Romans, he also brought the conditions of building to perfection and also a rational relation with nature were already known at an early date, as the visits of the Emperor Hadrian also (see Lecture, I, vi, 20; about 100 B.C.), was followed by the Greeks in their monumental structures; the proximity and practically in conservation and the form included by its commanded in them, and also contained fairly lavish, which the Romans had been great enough upon.

Columns, piers, solid walls and caves are opening pierced with a batter and with doorway and window openings diminished at top, the external white walls and colonnaded at which place the least for the portico, the beauty of the exterior interest arising of the work by columns, the pressure of all materials,— there are and cohesive so of fully claim credit and form the formal relationship of Greeks structural mechanisms, which figures and structural terms are strongly influenced by Egypt and Assyria!

Finally the beautiness are the simplest characteristic and the "external form of the building perfectly expresses its structural idea. The Greeks temple architecture could be erected without artificial means of strengthening it, and it would endure."

Matters were otherwise with the introduction of the arch and vault as an estetic movement in architecture. What Egypt left unfinished, Assyria reduced to a system, and so Greek Romans and Saxons this people as the first, that obtained results in the domain of the technique of building. Raise from the circular vaulted, it required the half domes and domes vaults, and people already were constructed over square rooms.(Lecture 7). Later was the Persians dated further assembly in this direction, and first by four arches walls and material transoms caused the transition from the square ground plan to the circular dome on the basis of the corresponding dome with a span of 32.37 to 42.65 ft. for the dome.[1]

1. See G. Giedion. Ein Buch Bauten de 19 Jahrh. Part VI; 2. E. Viollet. Entretiens sur l'architecture — Paris 1863 p.C. Paris, 1864.

The same simple principles of architectural statics of the Egyptians, to whom moreover the conditions of vaulting by corbelling and also a rational vaulting with voussoirs were already known at an early date, as the vaults of the Ramesseum in Thebes show (see Lepsius, I, pl. 80; about 1200 B.C.), was followed by the Greeks in their monumental creations; the same nobility and simplicity in construction and the form required by it are expressed in them, and they continued faithful thereto, until the West and East Romans broke through them.

Columns, piers, solid walls and those with openings constructed with a batter and with doorway and window openings diminished at top, the horizontal stone beams and cornices, the ceiling of stone slabs (at least for the porticos), the support of the horizontal internal ceiling of the room by columns, the absence of all vaulting,-- these are and continue to be of Egyptian origin and form the ground principles of Grecian monumental architecture, while figures and ornamental forms were equally influenced by Egypt and Assyria!

Elements and conditions are the simplest conceivable and the "external form of the building perfectly expresses its structural idea. The Grecian temple architecture could be erected without artificial means of strengthening it, and it would endure."

Matters were otherwise with the introduction of the arch and vault as an esthetic movement in architecture. What Egypt left unconsidered, Assyria raised to a system, and we should designate and esteem this people as the first, that obtained results in the domain of the technics of vaulting. Aside from the simple tunnel vaults, it mastered the half dome and dome vaults, and perhaps already threw construction over square rooms.(Khorsabad ?). After them the Persians dared further attempts in this direction, and first by four trumpet vaults and spherical triangles created the transition from the square ground plan to the circular dome on the basis of the octagonal form with a span of 39.37 to 42.65 ft. for the dome.[1]

*1. See M. Dieulafoy. L'Art Antique de la Perse. Part IV. Pl. V, XIV. Palaces of Ferouzabad and Sarbistan -- about 550 B.C. Paris. 1885.*

The same people (Sassanians) in the 6 th century A.D. afterwards excelled themselves by the construction of elliptical t tunnel vaults of 82.02 ft. span over the great halls of the r Royal Palace at Ctesiphon (of Chosroes). Tombs of great dimensions, constructed by corbelling, are shown to us by the Greccian mainland in the so-called treasuries, in those at Mycenae, Menidi, Orchomenos etc., of circular form in plan with the lines of a pointed vault in section. The Tomb of Atreus, still in good condition structurally, is with a span of 49.21 ft. a and also of considerable effect internally, and it remains an interesting structural work of the time of the Trojan war (somewhere before 1200 B.C.). A burial chamber constructed on the same principle, but of square plan and with but two walls connected bya vault, was discovered near Cnossos on Crete, designated as the royal Tomb Isopata (formerly Tomb of S. Idomeneos), which precedes in time the circular buildings mentioned.[1]

*1. See Durm, J. Ueber vormykenische und Mykenische Architekturformen und der Kuppelgräber der milesichen Kolonie Pantikapaion in Jahrb.d. K.K. Oest. Arch. Inst. in Vienna. Vol. X. 1907. P. 41 et seq; p. 290 et seq.*

In southern Russia -- near Kertch -- a similarly constructed tomb exhibits the attempt to construct the ceiling as a cloister vault by the corbelling out of the stone courses, and in another, the so-called royal Tumulus , is expressed the idea and the attempt is successful, to establish a steep conical dome over a square room by corbelled courses in spherical pendentives. According to the significance of the objects found, the buildings must be referred to the 6 th and 5 th centuries B.C.

At about the same time in Persia in a grander style and in the Crimea in small dimensions was carried out the same expedient, which about 1000 years later was brought into perfect form in S. Sophia at Constantinople. Intermediate steps might be made credible [2] in the allied and probably primitive structures of Syrian domed buildings, for example in Latakia and t the Church S. George at Ezra (515 A.D.), if the dates of these buildings were not ensured by inscriptions and a time of erection shown, that extends nearly to S. Sophia. The fame of having made the transition from the polygonal plan to the constr-

construction of the great domes on trumpets and pendentives remains to the Syrians and Byzantines without doubt. (Compare, for example, S. Vitale in Ravenna).[3]

*2. M. de Vogue. La Syrie Centrale. P. 61. Paris. 1865.*

*3. A correct representation of the transition from the octagon to the dome was first given by Corrado Ricci in his book,-- "Ravenna. Collezione di Monografie illustrate. Series Ia. -- Italia artistica. Bergamo. 1903. P. 49. -- Secondo l'aspetto originario della cupola" -- which would be more intelligible by the addition of a horizontal section at the height of the transition. What is given concerning this in other earlier works is simply false, according to my examination on the spot!*

Etruscans and Latins derived the theory from the Greeks. Syrian and Grecian architects performed good service for the Etruscans; Grecian architects, Anthemios of Tralles and Isidor of Miletus created the wonderful structure of the Church of S. Sophia with its low dome on spherical pendentives for a span of 98.43 ft. (6 th century; 532 A.D.). They were indeed surpassed by the tractable West Romans with their structures of the Pantheon dome(142.72 ft. span), of tunnel, cross and semidomical vaults, and the cloister and radial vaults of their baths and palaces.

But it was again the Greeks, who invented the vault constructed on the grandest scale in the Baths of Caracalla and of Diocletian, and indeed first executed in Pergamon and at the Odeion of Herodes Atticus in Athens, though on a smaller scale.

They were also Greeks, who omitted the opening for light at the vertex of the great dome (Pantheon), and instead of it arranged high side lights at the base of the dome. Greeks and Armenians extended and combined these two arrangements of high side and top lights by inserting above the pendentives the cylinder for admitting light and also crowned the vertex of the dome by a lantern for admitting light; a motive finally developed by the Italian Renaissance in a grand way on S. Peter's Cathedral at Rome.

They were also Syrians, who first permitted buttresses against arches and vaults to project internally or externally, while the West Romans still sought the solution in the unif-

uniform course of the walls. This also first became visible later (Minerva Medica) and in the completed manner with the addition of flying buttresses carried above the roof at the Basilica of Maxentius at Rome (330 A.D.), a splendid work of the period of Constantine, in contrast with which the 3-aisled basilican cathedrals, erected on the same principle, with their spans scarcely half as great and their complex system of f flying buttresses, make apparent the decadence from what simplicity, boldness of construction and internal effect demand.

Mediaeval undertakings in this domain thus clearly exhibit the principle, that we have placed for the Grecian temple:-- "The building perfectly expresses its structural idea," even if it likewise does not as a structural work surpass allied works of the preceding time, at least not in the spans of the vaults. Even if the Gothic mediaeval style starts in direct opposition to the antique, both still have something in common; "the absolute nobility," that Zielinski [1] designates as the blossom of the antique seed, when he correctly remarks, that the structural principle in itself creates no architectural style; in this the ornamental principle always takes a greater or lesser part. And if architectural beauty is the perfect expression of the idea in pure form,[2] then they divide the prize; the Egyptian-Grecian and the Mediaeval-Gothic styles!

*1. Der Antike und wir. Lectures by Th. Zielinski, Professor at the University of S. Petersburg. Authorized translation by E. Schöler. P. 97. Leipzig. 1905.*

*2. F. Th. Vischer. Aesthetik oder Wissenschaft des Schönen. Stuttgart. 1858.*

In conclusion may yet be said a word concerning the new and much discussed harmony of architectural creations with the la landscape surrounding them! Such may be true in a very general way, yet not in detail. The building retains its character, once expressed, the landscapes alternates its own, puts on other attire, like the men occupying it in the course of time, and whose taste, sensibility and feeling likewise change.

Grecian temples, the great Roman public buildings for utility, the palaces and greater designs of the Italian Renaissance, the mediaeval cathedrals -- they stand yet in their old places, p

partly unchanged, also partly violated by the taste of the time.

But they have remained, while the landscape has changed, by which should be understood, not the nearest surroundings but the change in general. For example, has the view of the landscape remained the same in the South as in the North? -- No! The decrease of ancient culture, the products of a new world have altered it. The sunny and fruitful regions of Syria, of Palestine and Asia Minor are desolate, and there now begin to restore themselves the Roman colonies of north Africa, like t the blooming Timgad and many other places, the Campagna at Rome, splendidly adorned by villas and gardens in the imperial period and with forests interspresed, has become desolate or meadow, the fields around Paestum and Ephesus are swamps -- these are changes by neglect and destruction. A different effect is produced by what a new civilization has brought with itself. Thus America gave us the wild vine (Vitis Labrusca), that now overruns columns and walls with red color in autumn, it furnished the South with the opuntia fig (Opuntia Ficus Indica) and the aloe (Agave Americana), and in the most recent period, Australia supplied the eucalyptus tree [8] (Eucalyptus Globulus Labill or fever tree).

*8. See Victor Hehn. Kulturpflanzen und Hausthiere. P. 448 et seq. Berlin. 1874.*

Opuntias and aloes characterize or enhance, as Victor Hehn expresses it, "the type of mediterranean landscape, that for a long time has received from the East its strong and quiet coloring." The lofty eucalyptus with its grotesque outlines, in smaller and more extensive groups, also planted along roads, has materially changed the appearance of the landscapes in central and southern Italy.

Have the buildings of the ancient world, restricted to oaks, sycamores and pines, become less attractive to us by the addition of these new cultivated plants, that have won a certain predominance and have indeed become characteristic in the Southern landscape? Do they lessen or heighten the effect of the now wooded mountain slopes, only slowly recovering from their baldness?

The peripteral structure with flat roof was succeeded without scruple in the same landscape by domed buildings, and these a-

again by the long basilicas without objection or pious wishes and assertions, that all artistic effect must be based upon the contrary, and that the pine only harmonized with the flat roof and the cypress with the dome, or the reverse, if harmony of forms were required.

The so-called architecture of the soil, justified by age alone, has never become supreme, God be praised, for we should now have remained on the standpoint of the lake-dwellers or of the cave men. And when men give out as such the creations of the Biedermeier period in the German empire or the Black Forest, Swiss or Tyrolese buildings, they are indeed in error and thus forget, that the first saw the light of the world about 80 years since, and that the latter are scarcely three hundred years old in their present form, that we do not know what preceded them, and that the landscape surroundings have not remained the same.

Unsuitable and intolerable finally became merely the vagaries of the unstructural styles. Still only the living is right, and every movement to arouse improvement in art is to be welcomed, even if it at first pursues a wrong path; men should then not forget, "the style only originates by structural principles and the consistent development of similar ornamental forms," and that in the denial of all style -- capriciousness, fanciful or abstruse also appear among the creations of architecture. What is required now corresponds neither to innate truth nor nobility, not even to suitability in most cases, nor does it accord with the constantly changing landscape. To learn to recognize the innate truth and nobleness in Grecian works in general and details is now our problem. First meditate, then commence, but one must first know something!

From the fever for restoring buildings, whose purpose had vanished, the Greeks were relieved by a happy fate; they do not fall under the condemnation of John Ruskin:-- "Restoration is a lie, from beginning to end"!

The adjacent synopsis and Plate 1 serve for a rapid orientation of the work and point out the way by which the important principles of construction have spread from the two centres of mentioned, over the wide earth.

ular and pointed tunnel vaults of voussoirs for buildings of utility and galleries of tombs.

The Larger constructed by corbelling.

Houses and dome vaults over square rooms in the Palace at Knossos (probably ceremonial) ~~[illegible]~~.

Dwellings with brick and low domes constructed on rollers. (See Layard).

MESOPOTAMIA:- Domes of vaulting [illegible] 20.27 ft. span with turrets [illegible] Carchemish 850 B.C. (According to M. Biondiday).

ASSYRIAN period:- Tunnel vaults of glitpsked from 20 to 60.02 ft. span. Palaces of Sennacherib in 8 th century A.D. [illegible] India. China and Japan to [illegible]

beams and glass. For tombs and monuments of utility.

Tunnel vaults of semicircular and pointed form. Vaulted basal joining - for the tomb chambers of the 8 d and 6 th dynasties. In Bekkaman (according to Gerstand) such a one from the time before 3192 B.C. [illegible] B.C. (18.12 ft. span at the [illegible]).

Domes over circular rooms consist of circles in Abydos. Sentoutbelling in Abydos and Deir-el-[illegible] in Giseh.

GREECE:- Frescoes and Mycenean period. Tunnel vaults by corbelling. Royal Tomb Tiryns near Dorpfeld or Greece. Rise of Minos 1800 B.C. Domes made by [illegible] ted such in Mycenae, Orchomenos, Menidi etc. up to 40-50 ft. [illegible]

Systematic representation of the course of architectural development among the different civilized peoples with reference to the monumental treatment of ceilings.

ASSYRIANS. EGYPTIANS.

The system of corbelling out horizontal courses to form inclined or curved lines was known to both nations and was employed by both.

Vaulted ceilings; semicircular and pointed tunnel vaults of voussoirs for buildings of utility and galleries of tombs.

Sewers, galleries in Mugheir, the latter constructed by corbelling.

Niches and dome vaults over square rooms in the Palace at Khorsabad (probably pendentives) 706 B.C.

Dwellings with high and low domes represented on reliefs. (See Layard).

PERSIANS:- Domes of voussoirs over square rooms up to 39.37 ft. span with trumpets (conical vaults and spherical pendentives in Firouzabad and Sarbistan 550 B.C.(According to M. Dieulafoy).

SASSANIAN period:- Tunnel vaults of elliptical form up to 82.02 ft. span. Palace of Ctesiphon in 6 th century A.D.

Further extension in Asia:- India, China and Japan to America.

In the former countries chief

Horizontal ceilings of stone beams and slabs, for tombs and buildings of utility.

Tunnel vaults of semicircular and pointed form. Vaulted passages-tunnel vaults with radial jointing - for the tomb chambers of the 3 d and 6 th dynasties. In Rekaknah (according to Garstang) such a one from the time before 3122 B.C. Elliptical tunnel vaults 1200 B.C.(13.12 ft. spanat the Ramesseum).

Domes over circular rooms con- of rings of bricks in pointed-arched form in Abydos. Semicircular arches constructed by corbelling in Abydos and Deir-el-Bahri. Covering by stone struts in the great pyramids and tombs in Gizeh.

GREEKS:- Premycenean and Mycenean period. Tunnel vaults by corbelling. Royal Tomb Isopata near Cnossos on Crete. Era of Minos 1800 B.C. Domed tombs by corbelling out in form of pointed arch in Mycenae, Orchomenos, Menidi etc., up to 49.21 ft. internal diameter. Period bef-

chiefly wooden ceilings; bricks and lime mortar known 800 B.C. Central America; Peru, Mexico, Yucatan. Polygonal masonry, corbelling with stones and lime mortar are known. Highest period 10 th century A.D.

PHOENICIANS as transmitters. Conical round buildings with corbelling of horizontal courses.

Gigantea at Gozzo; Hagiar Kim, the Nurhags.

ETRUSCANS AND LATINS:- Corbellings and voussoir vaults for the tombs and buildings of utility.(Bridges).

before the Trojan war(1400-1200 B.C.). Bricks and lime mortar at the buildings at Gournaia on Crete(18 th Century B.C.).

PHRYGIA:- Tomb of Tantalus, pointed tunnel vault by corbelling.

LYDIA AND CARIA:- Semicircular pointed tunnel vaults constructed by corbelling in Tumulus Cheresi; another of pointed form at Elsfarlik.

PANTIKPAON:- Cloister vaults by corbelling; domes over square rooms above spherical pendentives constructed by corbelling. (6 th and 5 th century B.C.). Lime mortar.

LYCIA:- Squared transverse beams support the ceiling beams of round timbers set close together.

The ceilings of round logs imitated by Tomb II in Mycenae. Mode of construction of beam ceilings in most ancient time.

OLDEST GRECIAN TEMPLE:- Wooden ceilings of portico and of cell; covering of beams by terra cotta slabs and cases. Free supports of wood and of stone. Porous limestone covered by plastering.

BEST PERIOD:- Stone ceilings of the porticos composed of marble beams and slabs (coffered ceiling). Retention of wooden coffered ceiling over the cell.

preferred structural materials.

ALEXANDRIAN PERIOD:- As in the Greek period, wooden and stone [illegible]

First cross vaults of masonry in Pergamon and in Athens(decor).

[illegible]- The historical wooden and stone ceilings are supplanted by vaulted ceilings. Concept of the structure and such in structure. First combination of the two. Variety of the vaulted accumulated ceiling of cut stone, bricks and concrete.

[illegible]

Vaults, i.e., round tunnels in Rome, Tivoli etc. Philippeville in Arles). Tunnel, cross, modical and plane vaults with smooth or coffered interiors, with and without intersecting compartments, inclined vaults, annular vaults, straight arches, closer vaults, domes over circular and polygonal rooms, radial v" vaults, conical vaults, domes with openings at vertex and hyperbolic lines (Pantheon and the Rotunda of Caracalla), construction by ribs of masonry (Treves, Pont-du-Card), transition from polychral cover walls to domes by corbelling the corners. Division of the vaults into supporting ribs and filling compartments, while the ribs lie in the surface of the vault. Arrangement of projecting buttresses (Minerva medica) and abutment p[illegible]

[illegible]

execution. Centring and root contacts. As forms of arches and [illegible] rotated arch, etrived arch, roseaque arch, arch of double curvature.(Semicircular arch in cylindrical mass).

[illegible]- [illegible] sided; the union vault, the dome with projecting ribs, the subdivisions in Syria and Byzantium, Syrian ceilings of stone slabs on supporting arches, transition to the dome over a con-

Stone supports exclusively, light crystalline limestone being the preferred structural material.

ALEXANDRIAN PERIOD:- As in the best period, wooden and stone ceilings.

First cross vaults of ashlars in Pergamon and in Athens(Odeon).

ETRUSCANS, LATINS AND GREEKS ABANDON THE PRELIMINARY STEPS:- The horizontal wooden and stone ceilings are supplanted by vaulted ceilings. Contest of the architrave and arch in architecture. First combination of the two. Victory of the vaulted monumental ceiling of cut stone, bricks and concrete.

WEST ROMANS:- Horizontal ceilings of stone slabs (Temples of Vesta, i.e., round temples in Rome, Tivoli etc. Ahphitheatre in Arles). Tunnel, cross, modical and niche vaults with smooth or coffered interiors, with and without intersecting compartments, inclined vaults, annular vaults, straight arches, cloister vaults, domes over circular and polygonal rooms, radial v vaults, conical vaults, domes with openings at vertex and high side lights (Pantheon and the Rotunda of Caracalla), construction by rings of masonry (Treves, Pont-du-Gard), transition f from polygonal outer walls to domes by corbelling the courses. Division of the vaults into supporting ribs and filling compartments, while the ribs lie in the surface of the vault. Appearance of projecting buttresses (Minerva medica) and abutment p piers against vaults (plans of the Baths and of Basilica Maximus). Great construction of tunnel, cross vaults and domes, (82.02-95.15-142.72 ft. spans). Great interiors and monumental execution. Ceiling and roof coincide. As forms of arches and vaults appear, the straight, segmental and semicircular, the pointed arch, stilted arch, horseshoe arch, arch of double curvature.(Semicircular arch in cylindrical wall).

EAST ROMANS:- To the acquisitions of the West Romans may be added; the melon vault, the dome with projecting ribs, the subdivision into supporting and filling parts plainly indicated, buttresses in Syria and Byzantium, Syrian ceilings of stone slabs on supporting arches, transition to the dome over a squ-

square- room by triangle and pendentives. Superficial pendentive- or for the great structure of S. Sophia (96.49 ft. span). High side light at base of dome, reflector and reinforcement of the vertex lighting. High side light further by the insertion of a drum between the ring over the pendentives and the circular dome, [illegible]

[illegible]

[illegible] of vast dimensions at S. Sophia.

EARLY CHRISTIAN, ROMANESQUE AND GOTHIC PERIOD:- From the ruins and prototypes of the architecture of the South and the East are developed in the West the Early Christian, the Romanesque and the Gothic styles of architecture. The vaulted ceiling of the interior retains its supremacy, the system, latent in the antique, of subdivided and structural masses transferring or supporting, filling or covering parts, plainly apparent, the semicircular arch must give way to the pointed arch, first for structural reasons, then as a form expression of new style; the concealed Roman ribs appear on the vaults, strongly dividing the surfaces (ribs are star vaults). The boldness of the antique vaulting is thus lost, their arms are no longer attained, yet the structural movement actually predominates. This constructional innovation has distinctly the shortest curve- [illegible]

The antique, with its simple and grand principles and its pleasurable beauty , again breaks through and appears in the:-

RENAISSANCE IN ITALY, FRANCE AND GERMANY:- That becomes a world architecture. Its present triumph in the domain of urban architecture remains in Italy, besides the Florentine Estrodal being S. Peter's Basilica in Rome. "It places the Pantheon on column," and it introduces into architecture in the m most commercial way, the double dome with the lantern above a drum admitting light. In France, it produced the Church of Invalides, Church of Val de Grace etc., where the wooden dome re- places the stone external dome, which makes possible a more elegant development in height on the exterior with lower proportions in the interior. In England, it creates the masterwork of Christopher Wren -- the Church of S. Paul!

Will the grandconditeer succeed in adding new things to all,

square room by trumpets and pendentives. Spherical pendentives for the great structure of S. Sophia (98.43 ft. span). High side light at base of dome, rejection and resumption of the vertex lighting. High side light further by the insertion of a drum between the ring over the pendentives and the circular dome, loading the vertex of the latter by a lantern admitting light. Pots as a vaulting material (S. Vitale in Ravenna). Buttresses of vast dimensions at S. Sophia.

EARLY CHRISTIAN, ROMANESQUE AND GOTHIC PERIOD:- From the ruins and prototypes of the architecture of the South and the East are developed in the West the Early Christian, the Romanesque and the Gothic styles of architecture. The vaulted ceiling of the interior retains its supremacy, the system, latent in the antique, of subdivided and architectural masses into bearing or supporting, filling or covering parts, plainly appears, the semicircular arch must give way to the pointed arch, first for structural reasons, then as a form expression of new style; the concealed Roman ribs appear on the vaults, strongly dividing the surfaces (ribs and star vaults). The boldness of the antique vaulting is thus lost, their spans are no longer attained, yet the structural movement actually predominates. This conventional innovation has relatively the shortest duration.

The antique, with its simple and grand principles and its unassuming beauty , again breaks through and matures in the:-

RENAISSANCE IN ITALY, FRANCE AND GERMANY:- That becomes a world architecture. Its highest triumph in the domain of church architecture remains in Italy, besides the Florentine Cathedral being S. Peter's Basilica in Rome. "It places the Pantheon on columns," and it introduces into architecture in the m most monumental way, the double dome with the lantern above a drum admitting light. In France, it produced the Church of Invalids, Church of Val de Grace etc., where the wooden dome replaces the stone external dome, which makes possible a more elegant development in height on the exterior with lower proportions in the interior. In England, it creates the masterwork of Christopher Wren -- the Church of S. Paul!

Will the grandchildren succeed in adding new things to all,

which the civilization of the nations has produced during 6000 years? Perhaps, but not with the rapidity of a storm! The c cry, "Woe, that you are a grandchild," should not destroy our courage. The antique will show itself as a guide in a new change of affairs, as it has formerly done.

The little map shows the ancient routes and the capitals of the world.(Plate 1). From what capitals will the new be derived?

II. THE EARLIEST STONE STRUCTURES; WALLS, CITY GATES, PALACES OF RULERS AND ROYAL TOMBS.

The stone structures to be regarded as the oldest on Grecian soil are the massive walls of Tiryns, Mycenae and Argos, the first of these being probably already built 12 centuries B.C. and ruined by the Argives about 468 B.C.. We find similar walls in Asia Minor at Kalynda and Iassos in Caria, partly laid in regular, partly in random courses, also on Cyprus, Rhodes, Crete, in the delta of the Nile, and in southern Italy. Who constructed them? Were they members or workmen of a certain race, whose home became too crowded, and seeking new dwelling places or employment, they took their way over the coasts of Asia Minor toward Europe, leaving behind them these vestiges of their industry?

Or are these similarly constructed walls in the localities mentioned independent of each other, similar results of like conditions, produced by nations building in stone?

Yet similar walls are also found in China and in the table lands of Peru. Cuzco, 12,858 ft. above the sea (capital of t the Inca kingdom and conquered by the Spaniards in 1533), exhibits considerable remains thereof; these are the ruins of a great Temple of the Sun (Ynti), on whose site now stands a monastery, and the ancient Palace of the Incas. We are here amazed by the accurate jointing of the very large blocks of granite and porphyry of irregular forms and laid without mortar. The fortifications of the neighboring Cerro (Ollantay Tambo) are also wonderful, the exquisitely wrought stones of which must have been transported across the river from the quarry 2 leagues distant. The stone walls are composed of blocks of hard granite, up to 7.65 ft. wide, 12.3 ft. long and 6.56 ft. or more in thickness. Colossal slabs of stone with reentrant polygonal angles alternate in the lower portion of the wall with the smaller intermediate polygonal blocks, while materials of more nearly equal dimensions are employed above these.

But the walls are not merely constructed similarly; their openings have the same form as in Egypt, western Asia and Greece, the upright trapezoidal form of doorway diminished up-

ware-jars. In some cases, the so-called "vase" are even clearly [illegible] of the country by sacred animal figures in relief are also to be found.

The ship frieze:-- If we consider the [illegible] of art found in Egyptian tombs, we there find ornaments and pottery, whose attributes in form with Egyptian, Asian and Grecian models cannot be denied. The cross-hatch pattern, the fret, etc., occur in a perfectly developed state on textile fabrics and tapestries. The combination of colors thereon is generally happy; fringes of twin cords are found, as well as tassels of wool and cotton, and borders of small pieces of mother-of-pearl or of gaily colored feathers are sewed on the edge of the fabric, from which twin pieces of gold or silver are frequently sewn,-- embroidery work as found on the very ancient Assyrian sculptures. Figurativa on copper weapons very distinctly [illegible] and Grecian decorations!

[illegible] in the Egyptian Pyramids are lined [illegible], [illegible] even striking resemblances to the Grecian; the fret pattern from Yucatan leaves nothing to be desired in perfection of form in comparison with the Grecian, even as little as the hexagon can have [illegible] and also the recurved cusps leaf.(Fig. 8).

In the Nile Valley, the [illegible] of [illegible] are the lands of Peru, Guatemala and Mexico, but in the Old World are always in a level country!-- Does there exist a connection, that when European [illegible] with America, the so-called copper colored and peculiarly characteristic American [illegible] there; can be proof to an Asian race, that red immigrated in interior primitive ages? The assumption is not [illegible]. The structure is central [illegible] dar taste. Their architects were acquainted with lime mortar, polygonal masonry, and the principle of cornelling out to cover openings; the arch was unknown to them, on the other hand, [illegible] not case the architectural works in Peru, Mexico and Yucatan

upwards. In some cases, the so-called "ears" are even clearly indicated; the pyramidal batter of the wall and the decoration of the doorway by sacred animal figures in relief are also to be found.

One step further:- If we consider the objects of art industry found in Peruvian tombs, we there find ornaments and patterns, whose affinities in form with Egyptian, Asian and Grecian motives cannot be denied. The chess-board pattern, the fret, etc., occur in a perfectly developed state on textile fabrics and tapestries. The combination of colors thereon is generally happy; fringes of thin cords are found, as well as tassels of wool and cotton, and borders of small pieces of mother-of-pearl or of gayly colored feathers are sewed on the edge of t the fabric, upon which thin plates of gold or silver are frequently sewn,-- embroidery work as found on the very ancient Assyrian garments. Engravings on copper weapons very distinctly represent the waves of the sea, that characteristic Egyptian and Grecian decoration!

Also on Chinese pottery of ancient times and on Mexican pottery (now in the British Museum) are found ornaments, that possess striking resemblances to the Grecian; the fret pattern from Yucatan leaves nothing to be desired in perfection of form in comparison with the Grecian, even as little as the Mexican sea wave pattern and also the recurved ovate leaf.(Fig. 6).

In the New World, the centres of civilization are on the high table lands of Peru, Cundimarca and Mexico, but in the Old World are always in a level country!-- Does there exist a connection between these works of the Old and New Worlds! So much is certain, that when Europeans became acquainted with America,t the so-called copper colored and peculiarly characteristic American existed there; did he belong to an Asian race, that had immigrated in indefinate primitive ages? The assumption is not improbable. The structures in central America have an East Indian taste. Their architects were acquainted with lime mortar, polygonal masonry, and the principle of corbelling out to cover openings; the arch was unknown to them, on the other hand, as well as iron and its use for working tools. And yet we must not date the architectural works in Peru, Mexico and Yucatan

back beyond the 10 th century A.D. The seals are not yet broken; everywhere the same needs may have produced the like Ideas; A desire to conclude that certain similar monuments in different parts of the world are due to the same authors is at least deceptive.

The same idea is expressed by Virchow in his preface to Schliemann's Ilios:- "But experience has taught us how uncertain are archaeological "guiding muscles." The human mind finds in different localities the same things and in the same place different things. In the same period are developed certain artistic or technical forms without any connection between the artists or workmen."

The Phoenicians were already settled on the coast of Syria in 2000 B.C., and they transported the developed civilization of Egypt and of Babylonia to all the shores of the Mediterranean Sea; acquisitiveness led this mobile Semetic race to Great Britain and India. Its proud cities have disappeared from the earth; but vestiges of their activity in building are preserved for us in the noble ashlar walls on the island of Arvad and near Marathus; remains of temples on Malta, Gozzo, and at Amrith are further evidences thereof, as well as the massive substructures on the shore and in the citadel of Carthage, and in the retaining walls of the Temple of Solomon, constructed about 1014 B.C. The wall with closely fitting joints is built of great blocks, moderately bonded; these blocks have drafted margins with rough projecting faces. (Fig. 7).

Similar characteristics are found in the old walls on the Argolic gulf; Euripides says that these were in accordance with Phoenician rules of building. The Phoenicians and Carians are named as the earlier inhabitants of the Greek islands. The l latter were often intimately connected with the Hyksos, who ruled in Egypt, and they settled o n the Greek islands after being expelled from Egypt. Mention is made of the immigration of Phoenician and Egyptian colonists into Greece. Pelasgians also make their appearance; they are now barbarians, now ancestors of the Hellenes, then a Hellenic race. We will not linger in the foggy and dangerous path of ethnographic research; I conform to Schliemann's opinion, that the name Pelasgian was

originally the designation of some one of the many races, that formerly inhabited Greece, and that this name was later employed as the most general appellation of all pre-Hellenic races, without regard to its true ethnographic relations. But the Pelasgians, which we thus oppose to the Pelasgians, were doubtless comprised under the common name of "Pelasgians."

This ancestry is known Hellenized and also Pelasgian. Thus terms it polygonal masonry.

On this hill are numerous remains of ancient walls, built of irregular polygonal blocks; others consist of horizontal, and where bed joints frequently crossed on other courses.

Towns in the Peninsular and Peloponnesian masonry are based upon the alternation of the rocks in which that masonry is.

The layers in regularized of some Lacedemonian blocks, only out on the bed and joint surfaces, which are chinked with small stone spalls and strengthened by clay mortar, laid up in sunning alternate any layers. Frequently this also is not using quadrangular or irregular stones, usually arranged so all long, alternate polygonal masonry with clear junction. It is later than the Cyclopean and extends down into the historical period. The setting in courses occurs without the aid of any mortar.

In connection with polygonal masonry also occurs isodomic masonry, built of regular prismatic stones in horizontal courses, where the joints are parallel to walls, where at angles. This also frequently occurs merely as a horizontal course for leveling up polygonal masonry. Pure and mixed polygonal masonry belongs to the same period.

Then was the manner of later Pelasgian walls: Large and irregularly, they appear in Tiryns and Mycenae, as retaining walls, and as substructures of temples; in Argolis, they were cemented for adhesion and strength, for supporting of a mass connected. Accordingly as each man readily abandoned his dwelling place in earlier times, when compelled by a stronger man,

originally the designation of some one of the many races, that formerly inhabited Greece, and that this name was later employed as the most general appellation of all prehellenic races, without regard to its true ethnographic relations. But the Hellenes, which we thus oppose to the Pelasgians, were doubtless nothing more than a single member of the series of allied races comprised under the common name of "Pelasgians."

This masonry is termed Pelasgian and also Cyclopean. Semper terms it polygonal masonry.

We find the walls here considered to be constructed of irregular blocks with spalls in the interstices of the joints, or of carefully wrought polygonal blocks; others consist of horizontal courses of stones , whose and joints are not always vertical, and whose bed joints frequently encroach on other courses.

Common to the Cyclopean and polygonal masonry are great differences in the dimensions of the stones in using hard materials.

The former is constructed of great limestone blocks, only cut on the bed and joint surfaces, which are chinked with small stone spalls and strengthened by clay mortar, laid up in courses without any batter. Differing from this is the polygonal masonry of irregular stones, carefully bressed on all beds, joints and visible surfaces, with close jointing. It is later than the Cyclopean and extends down into the historical period. The setting in courses occurs without the aid of any mortar.

In connection with polygonal masonry also occurs isodomic masonry, built of regular prismatic stones in horizontal courses, where the beds and joints meet at right, acute or obtuse angles. This also frequently occurs merely as a horizontal course for leveling up polygonal masonry. Pure and mixed polygonal masonry belongs to the same period.

What was the purpose of these gigantic walls? Among the Phoenicians, they served as dykes and quays, as protecting walls, and as substructures of temples; in Argolis, they were bulwarks for offense and defense, the beginning of a civic commonwealth. Accordingly as each man readily abandoned his dwelling place in earlier times, when compelled by a stronger man,

and no wealth to be acquired, but merely evidence to be ero-
ded, yet circumstances were changed, when man strove for
money, fortune and profit. Accumulations must be secured, pro-
tected and defended from marauding, by some giving one or other
public and visible sign were sufficients to issue warnings to
industry and labor of the hands; deterred against robbery, a
whether commercial land and of occupation. The Acropolis in
ancient topography, as mentioned and as survival of the memory
the strongest and the rules the criminally small occupiers ho-
ly. Mining and defense took place behind the walls mentioned,
and some circumstances have given occasion for strong dwelling
places enclosed by walls. Troyadhes places the oldest cities
far from the sea, those founded later being close to it, the
former protected by their natural situation, the latter by the
walls.

This may conjectures probably have been in Greece at the time
of the Venice era (11th-12th c.), and first [illegible] ex-
tremely important underlying of the Hellenic race.

The lower Aegean points of Cyprus, whose habitants were be-
ken from a stone quarry about a half hour distant from the ci-
ty (per [illegible] of Mycenaeans), which is just [illegible]
portion to the most primitive masonry.

The [illegible] of the [illegible] walls, here at [illegible]
from the quarry, without any further work on the end, bed or
face surfaces, and they are laid in courses without any cement-
ing material; the interstices produced by the courses are filli-
ed with small stone [illegible]. The larger stones
measure 4.92 to 6.56 ft. long and up to 3.28 ft. high (fig. 9).
The walls were generally [illegible] of 17 ft. in some
places.

The [illegible] and [illegible] walls where
walls are [illegible]. Their clear width averages 8.5 ft. (exact
measures are impossible in consequence of the rough and uneven
surfaces of the stone; figs. 9, 10), with a height of about
3.84 ft. The walls are composed of three vertical courses, t
[illegible] of [illegible] [illegible]
er at top, meeting capricious and inaccurately, after the
accredited form of the arches. With the rude shapes of the

since there was no commerce nor rational agriculture in Greece and no wealth to be acquired, but merely existence to be prolonged, yet circumstances were changed, when men strove for money, fortune and profit. Acquisitions must be secured, protected and defended from mankind, to whom gains won quickly, boldly and without toil were preferable to those earned by the industry and labor of the hands; defended against robbery, a vocation conferring fame and not disgrace. The possessors gathered together; the poorer entered the service of the richer; the strongest led and ruled the originally small corporate body. Mining and defense took place behind the walls mentioned, and these circumstances thus gave occasion for strong dwelling places enclosed by walls. Thucydides places the oldest cities far from the sea, those founded later being close to it, the former protected by their natural situation, the latter by the walls.

Thus may conditions probably have been in Greece at the time of the Trojan war (1194-1184 B.C.), the first common and politically important undertaking of the Hellenic race.

The lower circular walls of Tiryns, whose materials were taken from a stone quarry about a half hour distant from the city (see what was said of settlements), belong by their construction to the most primitive masonry.

The stones are of the most varied sizes, just as they came from the quarry, without any further work on the end, bed or face surfaces, and they are laid in courses without any cementing material; the interstices produced by the courses are filled with small stone spalls, also set dry. The larger blocks measure 4.92 to 6.56 ft. long and up to 3.28 ft. high (Fig. 8). The walls must originally have had a height of 59 ft. in some places.

The casemate-like galleries and their vaulting within these walls are unique. Their clear width averages 6.5 ft. (ekact measures are impossible in consequence of the rough and uncut surfaces of the stone; Figs. 9, 10), with a height of about 9.84 ft. The walls are composed of three vertical courses, t the ceiling is of corbelled courses of ashlars bonded together at top, meeting capriciously and inaccurately, after the accidental form of the stones. With the rude shapes of the

ascent, this kind of vaulting can be justly be termed polygonal, as can the triangular openings in the external wall of the gallery, also formed by corbelling and extending down to the ground. Similar wall openings are found in the regal-

Polygonal walls of the perfected style and with the greatest care in execution, composed with sashes, are found on the alcove of the swepped bare rock, on which stands the citadel of of ancient monuments, which extends in the vicinity of the present city. The material is a limestone, now shining with a fine cool gray and glowing with warm tinge in other places, it such comes from the immediate vicinity. The faces of the larger blocks are 2.81 m. by 4.27 m to 5.91 m., with nearly projecting faces from irregularities are unnecessary; as in the well preserved portions. Mortar is also not employed here. The indenting of one stone into another is frequently quite artificial; the external surfaces of the sashes are irregular pentagons, hexagons or heptagons. The lower

high), above which is an obliterated inscription.(Fig.11).

tiple of the arch in this irregular network of sashes subject to tension and compression. The blocks do not rest on each other as in walls of sashes in horizontal courses; they con-

ar arrangement. I may question whether this was the reason

rists probably supplied the leading motive therefor. The irregular sashes or breccia-like stones, of which most polygo-

ture, and the roughly broken sashes always have a rounded face, which is most readily and economically dressed with short stone. Materials in strata are dressed into regular blocks is never used for polygonal masonry; compare the restoring

stones, this kind of vaulting can as little be termed pointed-arched, as can the triangular openings in the external wall of the gallery, also formed by corbelling and extending down to the ground. Similar wall openings are found in the regularly coursed walls of the ancient structures near Missolonghi.

Polygonal walls of the perfected style and with the greatest care in execution, coursed with ashlars, are found on the slopes of the steepand bare rock, on which stands the citadel of Larissa, the former fortress of Argos; they terminate a series of ancient monuments, which extends in the vicinity of the present city. The material is a limestone, now shining with a fine cool gray and glowing with warm tints in other places, t that comes from the immediate vicinity. The faces of the larger blocks are 3.81 ft. by 4.27 ft to 5.91 ft., with neatly projecting faces free from irregularities and unevennesses; the faces gently curve at the edges, which are dressed with great exactness, showing the very close contact of the stones in the well preserved portions. Mortar is also not employed here. The indenting of one stone into another is frequently quite artificial; the external surfaces of the ashlars are irregular pentagons, hexagons or heptagons. The lower corner-stone of the wall bears on its outer surface a nearly unrecognizable low relief (a sitting figure about 1.18 ft. high), above which is an obliterated inscription.(Fig.11).

J. Braun and G. Semper desire to recognize the latent principle of the arch in this irregular network of ashlars subject to tension and compression. The blocks do not rest on each other as in walls of ashlars in horizontal courses; they actually form arches under compression on account of their peculiar arrangement. I may question whether this was the reason for the complicated jointing; the peculiar forms of the materials probably supplied the leading motive therefor. The limestone ashlars or breccia-like stones, of which most polygonal walls are constructed, always have a short conchoidal fracture, and the roughly broken ashlars always have a rounded face, which is most readily and economically dressed with short sides. Materials in strata and breaking into regular blocks is never used for polygonal masonry; compare the retaining

sulis of Jerpoetis, built of ashlars from the Cancrop,(Ara.7).

Hydrostatic balances based principally upon the mechanical fluids of air (Hydrostatic pneumatics) are exactly similar to those used for the projects whose are placed at the bottom in the first course on the ground; the angle between the stones already set is measured by a bevel, and a stone with about the same angle is sought and fitted there; the same process is followed for the successive courses. (Fig. 12).

Physical, Hydrostatic, Hydrostatical Balances.

The finest remains exist in the side walls of the so-called Treasury of Atreus and in those of the Gate of the Lions, which forms the entrance to the acropolis. The stone quarry is here also in the immediate vicinity; the material being supplied by the slopes of the double-peaked Mount Euboea, 2427 ft. high, which surrounds the Argolic amphitheatre. The blocks are laid in courses, neither exactly horizontal nor quite parallel, the end joints not being always vertical, and to mortar is used. The faces of the ashlars are parallelograms or trapezoids, the external surfaces are more roughly done, so that as permitted by the nature of the material; the stones are somewhat curved towards the edges, so that the joints do not exactly fit. The end joints in the side walls at the Gate of Lions are not arranged in structurally correct bond as often asserted, but this is incorrect. (Fig. 13 [1]). The ratio of height to length varies from 1 : 3 to 1 : 8, or 1 : 4 and 1 : 6. The lintel of the doorway is one of the largest monoliths ever used in architecture. The strength of this massive stone, in the case of two blocks bonded together, resembles the horned capitals, together with their weight.

The lintel of the Gate of Lions is 14.78 ft. long, 7.87 ft. wide and 8.87 ft. at the middle, the upper side being convex, its opening being diminished some 0.74 to 0.75 ft. towards and with a clear span of 9.85 or 9.85 ft. It is not loaded by the masonry above it, but the circumfully 3 courses are corbelled out to relieve it. The resulting triangular opening is again closed by a slab 8.84 ft. wide, 11.98 ft. wide at bottom and 2.00 ft. thick. This bears the oldest monumental sculpture in Greece. (Fig. 13 [1]). The relief slab represents sacra

walls of Jerusalem, built of ashlars from the Lebanon.(Fig.7).

Viollet-le-Duc believes these polygonal walls to result from the accidental forms of the quarried stones or boulders; therefore the broadest stones are placed at the bottom in the first course on the ground; the angle between the stones already set is measured by a bevel, and a stone with about the same angle is sought and fitted there; the same process is followed for the succeeding courses. (Fig. 12).

Mycenae, lying near Argos, again exhibits Cyclopean masonry. The finest remains exist in the side walls of the so-called Treasury of Atreus and in those of the Gate of the Lions, which forms the entrance to the acropolis. The stone quarry is here also in the immediate vicinity; the material being supplied by the slopes of the double-peaked Mount Euboa, 2297 ft. high, which surrounds the Argolic amphitheatre. The blocks a are laid in courses, neither exactly horizontal nor quite parallel, the end joints not being always vertical, and no mortar is used. The faces of the ashlars are parallelograms or trapezoids; the external surfaces are made tolerably even, so far as permitted by the nature of the material; the stones are somewhat curved toward the edges, so that the joints do not exactly fit. The end joints in the side walls at the Gate of Lions are not arranged in structurally correct bond is often asserted, but this is incorrect. (Fig. 15 [1]). The ratio of height to length varies from 1 : 2 to 1 : 3, or 1 : 4 and 1 : 5. The lintel of the doorway is one of the largest wrought stones ever used in architecture. The stability of this masonry chiefly depends on the use of the largest blocks possible, besides the bonded coursing, together with their weight.

The lintel of the Gate of Lions is 14.76 ft. long, 7.87 ft. wide and 3.67 ft. high at the middle, the upper side being convex, its opening being diminished some 0.74 to 0.75 ft. upward, and with a clear span of 9.85 or 9.52 ft. It is not loaded by the masonry above it, but the originally 5 courses are corbelled out to relieve it. The resulting triangular opening is again closed by a slab 9.84 ft. high, 11.93 ft. wide at bottom and 2.00 ft. thick, that bears the oldest monumental sculpture in Greece. (Fig. 13 [1]). The relief slab mentioned shows

two bases placed very near each other and covered by a common stone (Schliemann believes this to be an altar); from this rises a column in the central line of the triangle, whose base is formed by a slightly projecting fillet, its shaft being much injured on the left side and being connected with the capital by a cove. By this and the heavy-headed capital twice stepped moulding or bell shape and a crowning abacus, the column seems diminished extremely little downward. I say "seems", since the outline on the right of the central axis is set vertical, and that on the left of the axis is made uncertain by injuries and weather. After repeated visits to the original on the spot, I am unable to recognize any increase in the diameter of the shaft of the stele, to the extent usually given by statement and illustration. This stele already in our time has suffered many paper squeezes and rubbings. That steles, table and chair legs, even from the most ancient times, were made thinner below that above, is well known and is the same today. Accordingly if we retain the idea of a "stele" for the work, an enlargement of the support upwards did not attract a attention. On the other hand, if we regard it as a cast of a complete column in the architectural sense, then according to the date of origin, such a caprice would not further cause notice by the wise. It had its embodiment in the columns of the promenade hall at Karnak of the time of the 18 th dynasty. (Thothmes. 1597-1447 B.C.). The shafts are there but slightly enlarged upwards, a procedure that has received little consideration.

*1. Fig. 14 is from a photograph of the original in place a and shows the present condition of the surface of the stone. Compare this with the plaster cast in the Berlin Museum, whose imperfections have already produced so much confusion, and unfortunately later found acceptance in the splendid work of Perrot and Chipiez.*

The bloom of Mycenean civilization falls in the period from 1900-1200 B.C. according to some, but according to others in the years from 1500-1200, thus in any case before the Trojan war. Asians and Egyptians were then well known. This acquaintance could also be expressed in architecture, if not in the

[illegible] pressed in diameter about 2.64 ins. at top -- exactly unique in the architectural history of the ancient world. The shaft [illegible] — but it was [illegible] ed any relations with the stele at Mycenae. That a known reference for the form might exist, has indeed been suggested by A.P.Maiuri[1] in the attempt to test the question on the object itself. He says:- "My own measurements make the column [illegible] work is too rough for any minute exactness of measurement." [illegible] 1 1/4 ins. between the upper and lower diameters of the shaft [illegible] 16 recessers on the basis of the statements mentioned by examination by the aid of a large photograph, and what can be ob- [illegible] most parts of the shaft be measured, that indeed seemed unpre- [illegible] I estimate the difference as measured too large, that it be in general intended to keep at best within the limits of the perverse Egyptian column, and a difference of 0.99 instead of 1 1/4 may have resulted.

1. Journal of Hellenic Studies. Vol. 7. p. 189. Note 1. London. 1886.

(r the spaces lie four rolls or round sticks, appearing on the front as inverted round discs, as they were similarly so [illegible] ly adjacent Tomb in Mycenae are they excavated, and such again [illegible] not free from objections, in regard to which a doubt is expres- [illegible]

[illegible]

form of the capital, yet in that of the shaft of the column. The Egyptian prototype -- a stone column 20.81 ft. high and increased in diameter about 8.54 ins. at top -- exists unique in the architectural history of the ancient world. The shaft reversed and the capital distorted -- but it was done once and we must consider it. Lepsius first determined it, and Perrot and Chipiez enlarged upon this abnormal column, without seeking any relations with the stele at Mycenae. That a known preference for the form might exist, has indeed been admitted by J.H.Middleton [1] in the attempt to test the question on the object itself. He says:- "My own measurements make the column about 1 1/4 ins. wider at the top than at the bottom, but the work is too rough for any minute exactness of measurement," and he thus determines under the assumption a difference of 1 1/4 ins. between the upper and lower diameters of the shaft for a height of 5.71 ft. for the stele, especially emphasizing that the condition of the sculpture no longer permits accurate measurements. I agree in this with Middleton. Fig. 16 represents on the basis of the statements mentioned my examination by the aid of a large photograph, and what can be determined, but which does not agree with what the cast in the P Berlin Museum best gives. Middleton does not state how and at what parts of the shaft he measured, that indeed seemed unnecessary to him in the condition of the sculpture as described. I estimate the difference as measured too large, that if he in general intended to keep at best within the limits of the perverse Egyptian column, and a difference of 0.98 instead of 1 1/4 may have resulted.

*1. Journal of Hellenic Studies. Vol. 7. P. 163. Note 1. London. 1886.*

On the abacus lie four rolls or round sticks, appearing on the front as imperfect round disks, as they were similarly to be found on Lycian tombs, above them being a square slab. Also on the covering above the lintel of the doorway of the nearly adjacent Tomb in Mycenae are they executed, and then again on a small clay object (little altar) at Cnossos [1]), certainly not free from objections, in regard to which a doubt is expressed concerning the required form of the supporting little column.

of round, which I was unable to establish as a correction -- the various statements may be referred to the inaccuracy of the original in execution. A fragment of a frieze from Mycenae in gray marble and belonging to the "Fisch collection," i.e. it. high and now exhibited in the British Museum, permits one occurrence to be clearly recognized. The ships are three somewhat long and sometimes polygonal in form, according to the quality of the work. The fragment is placed at the height of the eye and can therefore be accurately observed. On a "Ly-cian" fragment of a crenelled or the fixed block are the ends of the round stroke curtly circular, but the outer ones are oval! During the column are two animal forms with their fore-feet resting on the pedestal, designated as lions by Fauvanies. T their backs as well as the arex of the triangular sculptured " star exist no lower. The peculiar fractured surfaces and the holes for metal pins at the necks show, that the necks were not wrought in the same piece as the slab, but were added; the small free space on the star beside the places where attached show, that they looked outward from the sculptured slab. They one when it was elsewhere said:- "The animals look down on th those sweating," although they no longer have heads, and thus suit forms of the doorss as well as the treatment of the tails without truth recall an Assyrian conception and style of hand-ling. [1] These are also recalled by the entire composition, in which this heraldic ornamentation recurs, and possess easily "The animals grouped in a pair, and which are symmetrically opposed to each other on both sides of a separating medium," may serve as proof of the particle:-"that symmetry shows it-self even as a requirement for all decorative art creations, whose in manner from the beginning, that the Chinese knew

*1. See J. Durm in Jahrb. des K.K.Oest. Arch. Inst. Ueber vormykenische und Mykenische Architekturformen. Vol. 10. P. 41 et seq. Vienna. 1907.*

These disks are given differently in new publications (see Athen. Mitth. des K.D. Arch. Inst, 1879) as octagonal instead of round, which I was unable to establish as a correction -- the various statements may be referred to the inaccuracy of the original in execution. A fragment of a frieze from Mycenae in gray marble and belonging to the "Elgin collection," 1.48 ft. high and now exhibited in the British Museum, permits the occurrence to be clearly recognized. The disks are there sometimes round and sometimes polygonal in form, according to the quality of the work. The fragment is placed at the height of the eye and can therefore be accurately observed. On a "Ly-cian" fragment of a cornice to be found there are the ends of the round sticks chiefly circular, but the outer ones are oval! Facing the column are two animal forms with their fore-feet r resting on the pedestal, designated as lions by Pausanias. T Their heads as well as the apex of the triangular sculptured slab exist no longer. The peculiar fractured surfaces and the holes for metal pins at the necks show, that the heads were not wrought in the same piece as the slab, but were added; the small free space on the slab beside the places where attached show, that they looked outward from the sculptured slab. They need not have been of metal, on account of the facts described, and when it was elsewhere said:- "The animals look down on th those entering," although they no longer have heads, and this is again a statement without reflection! The muscles and the soft forms of the bodies as well as the treatment of the tails without tufts recall an Assyrian conception and style of handling. [1] These are also recalled by the entire composition, in which this heraldic ornamentation recurs, and because early Grecian art certainly was much under oriental influences. [2] "The animals grouped in a pair, and which are symmetrically opposed to each other on both sides of a separating medium," may serve as proof of the principle:-"that symmetry shows itself even as a requirement for all decorative art creations, innate in mankind from the beginning, that the Chinese knew

[illegible] in the Berlin Museum — but [illegible] it was likewise in use 1100 years before the origin of Assyrian royal palaces." E. Adler[3] recognises in the column and with its capital of round sticks the art symbol of the royal house, the lions being its guardians, and before the royal hall stood the [illegible] "Therefore [illegible] royal temple was under divine protection."

1. See the allied Egyptian monuments, the lucky handle from Faral and the [illegible] alabaster [illegible] of Amarna. [illegible] Asiatic Studies. Vol. 8, pls. 17, 18.

2. See A Riegl. Stilfragen. Grundlegen zu einer Geschichte der Ornamentik. [illegible] Berlin. [illegible]

3. Ex. F. Adler. Die Israelitischen Altertümer. Theil 2. Altertümer und Kultstätten. Berlin. 1908.

[illegible] tion of 1904):- "A passage 22.31 ft. wide and 49.21 ft. long leads to the main entrance, the famous gate of lions. The walls on the right and left, the former strengthened like a tower, exhibit in a singular way the vertical end joints of the blocks over each other, instead of the upper stones covering the lower ones." by repeated observation on Easter Sunday in 1906, I ascertained that on the left of the entrance, the solid rock is inclined and is crossed for several yards high in the side wall, and that the colossal sphinx only begin above this; further, that on the right side the sphinx rest directly on the ground, and that the view shown in fig. 15, according to [illegible] "Jacobites" [illegible] is the [illegible] rather, rather possible a very good modern fabrication. The former statement is therefore based on an error.[1]

1. Not to criticise all the corrections made, but rather [illegible] - "It is still the rule of man to only reach truth through error").

At Deir el Kim, about 4 1/2 miles south of the village of Kerdi on Mars. Enormous slabs of stone set upright first enclose a semicircle, above which commences the horizontally courses masonry of great colossal blocks, an arrangement retained in principle in the cell wall of the Greeian temples of the best per-

this just as well as the ancient Egyptians -- and that it was likewise in use 1000 years before the origin of Assyrian royal palaces." F. Adler [3] recognizes in the column and with its ceiling of round sticks the art symbol of the royal house, the lions being its guardians, and before the royal hall stood the stone double throne. The royal house and the royal throne were under divine protection."

*1. See the allied Phrygian monuments, the ivory handle from Menidi and the island stones of Crete and of Rhodes. Jour. of Hellenic Studies. Vol. 8. Pls. 17, 18.*

*2. See A Riegl. Stilfragen. Grundlegen zu einer Geschichte der Ornamentik. P. 38-40. II. Der Wappenstil. Berlin. 1898.*

*3. Dr. F. Adler. Zur Kunstgeschichte. Vortra"ge, Abhandlungen und Vestreden. Berlin. 1906.*

On the scientific side is stated in K. Baedeker (p.328 of edition of 1904):- "A passage 32.51 ft. wide and 49.21 ft. long leads to the main entrance, the famous Gate of Lions. The walls on the right and left, the former strengthened like a tower, exhibit in a singular way the vertical end joints of t the blocks over each other, instead of the upper stones covering the lower ones." By repeated observation on Easter Sunday in 1906, I ascertained that on the left of the entrance, the solid rock is included and is dressed for several yards high in the side wall, and that the colossal ashlars only begin above this; further, that on the right side the ashlars rest directly on the ground, and that the view shown in Fig. 15, according to which no vestige of the "peculiar" position of the end joints appears, rather exhibits a very good bonded jointing. The former statement is therefore based on an error.[1]

*1. Not to criticise all the corrections made, but rather with reference to Riegl's words:- "It is still the fate of man to only reach truth through error").*

Of especial interest is the Phoenician masonry of the Temple at Hagiar Kim, about 4 1/2 miles south of the village of Krendi on Malta. Enormous slabs of stone set upright first enclose a semicircle, above which commences the horizontally coursed masonry of great oblong blocks, an arrangement retained in principle in the cell wall of the Grecian temples of the best per-

as Olympia, the Parthenon, the Theseion, the Propylaeon etc., have first above the ground the space-enclosing stones set on [illegible] only the [illegible] and [illegible] regular [illegible] array. (Ibid. 177).

In the Temple of Ptolemy, the masonry of large stones is made up of irregular blocks, one set on another, only restricted by the dimensions of the blocks; no centering material is used anywhere between the separate stones.

These massive blocks assemblies of [illegible] are so grand and mighty, that one may perceive and be astonished at their expression of an architectural formative power, though roughly sculpt, although they were squared and frequently executed in expression during the Renaissance period by the Etruscan pieces of the Hieroctive mobility. Assuming 28.28 ft. long, as in the First Palace, with bosses projecting 2.95 to 3.28 ft., as in the masonry of the terrace of the [illegible], [illegible] [illegible] in [illegible].

Another kind of masonry requires mention, the so-called Polygonic masonry existing in the remains of ancient buildings on [illegible]. [illegible] [illegible] of [illegible] polygonal stone slabs, breaking proportionally thin and left rough on all sides, as quarried, are laid on each other without mortar in [illegible], [illegible] [illegible] [illegible] [illegible] [illegible]. The walls therefore have a thickness of at least 6.56 ft.

For the walls of sun-dried bricks mentioned by Pausanias, a sufficient evidence has been found since the discoveries in the ruins of ruins at Kissarik.

The bricks are joined in courses; the masonry is strengthened by wooden sponges built in, and are constructed as in Fig. 16. The unburnt bricks are made of clay mixed with chopped straw, and they have a thickness of 3.9 to 5.9 ins., with a length up to 23.6 ins., while the clay joints are from 0.39 [illegible] [illegible]. The surface of the [illegible] is [illegible] covered by a thin wash of white clay (like pipeclay). [1]

1. See Durm, J. Zum Kampf um Troja. Berlin. 1890. Reprint [illegible].

period. The Temple of Poseidon at Paestum, the Temple of Zeus at Olympia, the Parthenon, the Theseion, the Erectheion etc., have first above the ground the space-enclosing stones set on edge, above this being only the bonded and coursed regular masonry. (Fig. 17).

In the Temple of Melkart, the masonry of large stones is again composed of irregular blocks, one set on another, only restricted by the dimensions of the blocks; no cementing material is used anywhere between the separate stones.

These ancient stone monuments of Phoenician and Pelasgian origin are so grand and mighty, that one may perceive and be astonished at their expression of an architectural formative power, though rudely acting, although they were equalled and frequently excelled in expression during the Renaissance period by the gigantic palaces of the Florentine nobility. Ashlars 28.24 ft. long, as in the Pitti Palace, with bosses projecting 2.95 to 3.26 ft., as in the masonry of the terrace of the same palace, were not often found, or excelled in antiquity.

Another kind of masonry requires mention, the so-called Dryopic masonry existing in the remains of ancient buildings on Euboa. Its peculiarity is due to the nature of the materials. Long slabs, breakink proportionally thin and left rough on all sides, as quarried, are laid on each other without mortar in courses, leveled up,and the joints are filled with small stones. The walls therefore have a thickness of at least 6.56 ft.

For the walls of sun-dried bricks mentioned by Pausanias, m manifest evidence has been found since the discoveries in the masses of ruins at Hissarlik.

The bricks are bonded in courses; the masonry is strengthened by wooden anchors built in, and are constructed as in Fig. 18. The unburnt bricks are made of clay mixed with chopped straw, and they have a thickness of 3.9 to 5.9 ins., with a lenghh up to 25.6 ins., while the clay joints are from 0.39 to 1.18 ins. thick. The surface of the wall is frequently covered by a thin wash of white clay (like pipeclay). [1]

*1. See Durm, J. Zum Kampf um Troja. Berlin. 1890. Reprint from Cent. d. Bauverw. 1890.*

Bricks - burned - of reddish-yellow clay were found in the

buildings in Gournia on Crete, some examples of which in the
[illegible] are referred to the bronze period -- 1100 B.C. [2]

[illegible]

18. Gordon. Bronze age 1100 B.C., and Note 1 there, where a
one brick is designated as measuring 15.88 ins. long by 8.95
ins. wide by 8.15 ins. thick, and as "hard, -like ---certainly
fire baked." -- I have satisfied myself concerning the latter
peculiarity of the bricks, and my measurements of the two bri-
[illegible]

[illegible] and a white mortar. The chemical examination by Privy Council-
lor Dr. Engler in Karlsruhe gave the following result for the
letter:- "The mortar outwardly consists of carbonate of lime and
[illegible] test mixture of Gypsum, for which I made another test afterwa-
rds. Accordingly it is ordinary lime mortar. From the round-
ed grains of sand, I might deduce the use of sea sand in the
preparation of the mortar." (Karlsruhe, June 2, 1908). If the
bricks are correctly dated by Miss E. A. Boyd, then must the
[illegible]
in connection with split stones and bricks).

[illegible] Additions to [illegible]-
als, strongholds for the safe keeping of acquired wealth and
[illegible]
chers of rulers, memorials for posterity, all these remains of
buildings are of architectural importance.

We indeed heretofore only knew of the former by the Homeric
poems, from which we must conceive the palaces of the rulers
to have been somewhat finer, than would be expressed from the
cellars and rude fortress walls, if Thucydides be not mistaken,
when he says (of course in reference to another point), "It
should be understood that Homer, as a poet, exaggerates the
greatness and beauty of things."

buildings in Gournia on Crete, some examples of which in two sizes are now preserved in the Museum at Candia. They were mentioned in the report of finds by Miss Harriet A. Boyd and are the referred to the bronze period -- 1100 B.C. [2]

*2. See American Jour. of Archaeol. Society's excavations at Gournia, Crete, 1901-1903 by Harriet A. Boyd. Vol. 1. No. 1. P. 18. London. Bronze age 1100 B.C., and Note 1 there, where o one brick is designated as measuring 13.58 ins. long by 9.25 ins. wide by 3.15 ins. thick, and as "hard,-firm ---certainly fire baked." -- I have sattsfied myself concerning the latter peculiarity of the bricks, and my measurements of the two bricks differ but little from those given.(Fig. 19).*

The bricks in the Museum bear traces of a bedding in clay and a white mortar. The chemical examination by Privy Councillor Dr. Engler in Carlsruhe gave the following result for the latter:- "The mortar chiefly consists of carbonate of lime and sand with the addition of some clay (loam ?) without the slightest mixture of Gypsum, for which I made another test afterwards. Accordingly it is ordinary lime mortar. From the rounded grains of sand, I might deduce the use of sea sand in the preparation of the mortar." (Carlsruhe. June 2. 1906). If the bricks are correctly dated by Miss H. A. Boyd, then must the use of lime mortar be also dated farther back.(Egypt was already acquainted with it earlier. Lime mortar in the pyramids in connection with split stones and bricks).

Palaces of rulers, citadels, dwellings of powerful individuals, strongholds for the safe keeping of acquired wealth and the preservation of ornaments and treasures, monumental sepulchres of rulers, memorials for posterity, all these remains of buildings are of architectural importance.

We indeed heretofore only knew of the former by the Homeric poems, from which we must conceive the palaces of the rulers to have been somewhat finer, than would be supposed from the defiant and rude fortress walls, if Thucydides be not mistaken, when he says (of course in reference to another point), "It should be understood that Homer, as a poet, exaggerates the greatness and beauty of things."

According to him, the Palace of Menelaus in Sparta gleamed

and silver, are found in the Palace of Minos.

on Asia by him, and that made possible his power and the ass-
ociated wealth of the Mycenaean kingdom, should be regarded
as "Homeric" of the generation of the heroes of the Trojan
dents, the Peloponnese Atreus and Agamemnon, should be regarded
as "Homeric" of the generation of the heroes of the Trojan
war, and the Mycenaean kingdom, which was the
axing out of the Trojan war.

The recent investigations have confirmed the dating of
the excavations in the citadel of Tiryns,[1] at Mycenae, and at
Troia, which are aided by our presentation of the palace of a
ruler, even if this be merely based on a ground plan. The lat-
ter (Fig. 30) exhibits the arrangement of the walls of the up-
per citadel, as it appeared with its massive fortifications on
the Homeric Hill-top, which from the Middle Ages of
Greek and Latin Homer, usually so very exactly described,
frequently set in horizontal courses, and set without cement,"
ited value in thin layers with the dimensions of the blocks.[2]
In the course of time, the joints and cavities have become fil-
ed with dust and clayey earth, which has substituted the use of
clay mortar, but which would indeed have been no better than
ordinary lime mortar.[3]

Schliemann, Tiryns. Die prähistorischen Ausgrabungen auf der Burg-
ruine von Tiryns etc. Leipzig, 1886.

Dörpfeld, W. Die Ausgrabungen auf der Burg von Tiryns. Athen. Mitt. XIII, 1888.

Schliemann, H. Schliemann's Ausgrabungen in Troja. 1902.

Dörpfeld, Wilhelm. Troja und Ilion. Ergebnisse der Ausgrabungen. Leipzig. 1902.

2. Stone blocks on the tower are 3.25 ft. high and up to
[illegible] ft. wide.

3. Cyr. Pseudomenos. M. Ashby, p. 17.

The Mycenaean kitchen-middens, which have furnished not with
clay mortar is evidently to be rejected.[4]

Fabricius, Ernst. Aus einem Kreis von Ausgrabungen. Ann. d. Inst. 1886.

with bronze, silver, gold, amber and ivory; walls plated with bronze, leaves and jambs of doors overlaid with plates of gold and silver, are found in the Palace of Alkinous.

Among others, Homer also calls Mycenai the "rich in gold"; Thucydides mentions the great treasures of Pelops, brought from Asia by him, and that made possible his power and the assignment of his name to this portion of the country; his descendants, the Pelopides Atreus and Agamemnon, should be regarded as "augmentors" of the possessions of the family until the breaking out of the Trojan war.

The Homeric descriptions were succeeded by the results of t the excavations in the citadel of Tiryns,[1] at Mycenae, and at Troja, which are aided by our presentation of the palace of a ruler, even if this be merely based on a ground plan. The latter (Fig. 20) exhibits the arrangement of the walls of the upper citadel, as it appeared with its massive fortifications on the isolated hill-top, rising from the plain. The ashlars of these are limestone blocks, roughly or more smoothly dressed, frequently set in horizontal courses, and set without mortar, as commonly done in antiquity, which would have had but a limited value in thin layers with the dimensions of the blocks.[2] In the course of time, the joints and cavities have become filled with dust and clayey earth, which has suggested the use of clay mortar, but which would indeed have been no better than ordinary lime mortar.[3]

*1. See Schliemann. Tiryns. Die prähistorische Palast der Könige von Tiryns etc. Leipzig. 1886.*

*Borrmann, R. Die Burg von Tiryns. Cent. d. Bauverw. 1886.P.89.*

*Schuchardt, C. Schliemann's Ausgrabungen in Troja, Tiryns, Mykenä, orchomenos, Ithaka im Lichte der heutigen Wissenschaft. Leipzig. 1890.*

*2. Stone blocks on the tower are 3.28 ft. high and up to 13.12 ft long.*

*3. See Schuchardt, C. Same, p. 40.*

The assumption that the water channels were likewise set with clay mortar is evidently to be rejected. [4]

*Thin coatings of lime paste on the beds are shown by the domed Tombs of Pantikapaeon. See Durm, J. Die Kuppelgräber der*

Wilhelmsen Palmyra Guatemala in the Jaeger, L. F. K. Gesl. [illegible] Vol. [illegible] Plaque. Vienna. —Ruins and the Inca buildings of concrete on Greece. 1890. B.C.

The ground plan of the Palace [1] is explained by the discoveries, Schliemann and Dörpfeld, as follows, and this explanation may be the less readily attacked, since the statements agree with the reality in all points, of which I am convinced by my observation at the place -- the last being in April, 1908.

1. Fig. 20 is a facsimile reproduction from Gest a. Kunzemann. 1890. p. 91.

"As shown by a glance at the plan (Fig. 20), the fortifications of the upper city exhibit great differences in strength and form. The most vulnerable parts have compelled the south east and the southern half of the west wall, especially since we have been informed of the plan of the frequently described so-called "palaces." The walls here, especially in their lower portions, are penetrated by long narrow passages, adjoining which are several by a number of rooms. These internal passages, as well as the stairways leading down to them, were all covered by means of corbelled courses of stones, and have possibly once flowed by openings like loopholes, as may still be recognized in the passage on the south side. What may have been the purpose of the arrangement described, cannot be guessed with complete certainty; yet the author of the work on Tiryns properly refers to entirely similar designs within the enclosing walls of Mycenae, which we know from Egyptian [illegible] as for occupation by men, provisions and war material. It remains questionable, how the now destroyed upper sections of the walls were constructed, and among other points, whether the plan of the lower casemates was there repeated, as is therefore. To the inner side of the upper walls, and especially at the level of the pavement of the entrance street or of the lower-court, portions seem to have been attached.

In the southwest angle of the citadel and on a natural projection of the rock is found a massive tower with two internal rooms, whose purpose remains uncertain, and further northwest is an underground stairway to the citadel, protected by a semicircle

*milesischen Kolonie Pantikapaon in the Jahrb. d. K. K. Oest. Arch. Inst. Vol. 10. P. 230. Vienna. 1907. -- Also see the brick buildings at Gournia on Crete. 1100. B.C.*

The ground plan of the Palace [1] is explained by the discoverers, Schliemann and Dörpfeld, as follows, and this explanation may be the less readily attacked, since the statements agree with the reality in all points, of which I am convinced by an observation at the place -- the last being in April, 1906.

*1. Fig. 20 is a facsimile reproduction from Gent d. Bauverw. 1886. P. 91.*

"As shown by a glance at the plan (Fig. 20), the fortifications of the upper city exhibit great differences in strength and form. The most remarkable parts here comprise the south wall and the southern half of the east wall, especially since we have been informed of the plan of the frequently described so-called "galleries." The walls here, especially in their lower portions, are penetrated by long narrow passages e, adjoining which are externally a number of rooms f. These internal passages, as well as the stairways leading down to them, were all covered by means of corbelled courses of stones, and they were probably once lighted by openings like loopholes, as may still be recognized in the passage on the south side. What may have been the purpose of the arrangement described, cannot be stated with complete certainty; yet the author of the work on Tiryns properly refers to entirely similar designs within the enclosing walls of Carthage, which we know from Appian (Hist Rom. I. Bekker. 1842. P. 220,1-8) served as stables, as well as for occupation by men, provisions and war material. It appears questionable, how the now destroyed upper portions of the walls were constructed, and among other points, whether the plan of the lower casemates was there repeated, as in Carthage. To the inner side of the upper walls, and especially at the level of the pavement of the entrance street or of the fore-court, porticos seem to have been attached.

In the southwest angle of the citadel and on a natural projection of the rock is found a massive tower with two internal rooms, whose purpose remains uncertain, and further northward is an entrance stairway to the citadel, protected by a separate

external wall, and by means of which a person could, from the ground level, pass up to the middle terrace of the citadel, and then by another stairway to the passage adjoining the men's hall of the Palace. Two other side entrances, which perhaps had the twofold purpose of serving as entrances and sally-ports, are found in the lower citadel; whether a similar one also once existed at the now destroyed southwest angle is no longer to be recognized. The principal gateway I could be used for chariots and horses, and turned away from the sea, lies at the middle of the eastern lower side, being accessible by a road 15.4 ft. wide, which ascends beside the wall. Within the gateway, the way divides to the lower citadel, to the middle terrace, and on the left to the upper citadel. The way to the lower citadel leads through a narrow alley between the eastern wall and the palace itself, first through an inner barrier gate G, and thence by a zigzag ascent toward to the southwest angle of the citadel, from which by a steep turn to the right, one passes into the outer propylaion I before the courtyard of the citadel. This propylaion, in its plan with external and internal portico and the true gateway wall between them, represents the simplest form of the model for the designs of gateways later treated by Greeian art in such different ways. The base of the walls is rubble stone, the stone thresholds with holes for wooden door jamb, and the circular plinths of the columns are still preserved. From the inner portico of the propylaion, we [illegible] the women's dwelling, and passing straight forward from thence, enter the great court. This is the fore-court of the Palace, entered through a gateway K, similar to the preceding one, but considerably smaller; one first enters a court of about 6550 sq. ft. in area, surrounded by porticos. Just on the right of the entrance through the gateway have been found the remains of an altar with a sacrificial pit. This was perhaps an altar of Zeus Herkeion, sometimes mentioned by Homer as found in the hall. The pavement of the court is almost entirely preserved and consists of a coating of lime, and the water is removed by a drain at the northwest angle. Opposite the altar and looking towards the south, lies the chief apartment of the Palace,

external work, and by means of which a person coming from the sea would first pass up to the middle terrace of the citadel, and then by another stairway to the passage adjoining the men's hall of the Palace. Two other side entrances, which perhaps had the twofold purpose of serving as entrances and sally-ports, are found in the lower citadel; whether a similar one also once existed at the now destroyed southwest angle is no longer to be recognized. The principal gateway b could be used for chariots and horses, and turned away from the sea, lies at the middle of the eastern longer side, being accessible by a ramp 15.4 ft. wide, which ascends beside the wall. Within the gateway, the way divides to the lower citadel, to the middle terrace, and on the left to the upper citadel. The way to the lower citadel leads through a narrow alley between the eastern wall and the Palace itself, first through an inner barrier gate c, and thence by a separate ascent upward to the southwest angle of the citadel, from which by a sharp turn to the right, one passes into the outer propyleion i before the courtyard of the citadel. This propyleion , in its plan with external and internal porticos and the true gateway wall between them, represents the simplest form of the model for the designs of gateways later treated by Grecian art in such different ways. The base of the walls is rubble stone, the stone thresholds with holes for wooden door jambs, and the circular plinths of the columns are still preserved. From the inner portico of the propyleion, we can go through a narrow passage directly to the courts before the women's dwelling, and passing straight forward from thence, enter the great court. This is the fore-court of the Palace, entered through a gateway k, similar to the preceding one, but considerably smaller; one first enters a court of about 3380 sq. ft. in area, surrounded by porticos. Just on the right of the entrance through the gateway have been found the remains of an altar with a sacrificial pit. This was perhaps an altar of Zeus Herkeion, sometimes mentioned by Homer as found in the hall. The pavement of the court is almost entirely preserved and consists of a coating of lime, and the water is removed by a drain at the northwest angle. Opposite the altar and looking towards the south, lies the chief apartment of the Palace,

[illegible] unconsecrated altar by the side as well as by its preferred location on the highest point of the rock of the citadel, and accessible from the court through a portico and a separate vestibule. Four columns supported the ceiling of the hall, at whose centre, in conformity to the statements of Homer, is found a circular structure, probably the hearth.

The dwelling of the women is on the east of the man's apartments, but it is not in direct connection with them. It exhibits a plan corresponding to that of the man's dwelling, though simpler; first a court, then a portico, from which one passes directly into the hall, and by side doors into the adjoining passages. The women's apartment has an area of about 46e sq. ft.; a hearth appears to have existed at the centre, just as in the man's hall. The floor consists of a coating of lime. [illegible] well with painted decorations, have been found in place.

The purpose of the numerous other apartments of the palace is not so assured as that of those mentioned. A series of rooms, accessible by passages and vestibules, lies in the northeast angle; in these should be recognized the sleeping apartments, and also perhaps the armory and treasury of the ruler. Two narrow adjoining rooms on the north side of the court, according to Dörpfeld's conjecture, contained the stairway to the roof, or to a possible upper story. From the court before the women's hall, one passes further southward to a third court. Thus, with all adjoining apartments, may have served for housekeeping purposes, and the rooms lying next the front gateway for the quarters of the guard and watch at the gateway. Another and in part badly ruined group of apartments adjoins the man's hall and its court on the west. Only one room of these may be determined with certainty, the bathroom o, whose floor consists of a single enormous slab of stone, 9.74 ft. wide, 14.8 ft. long and 2.3 ft. thick, with a total weight of about 22 tons. On the raised margin of the stone, water has channel for carrying off the water, are regularly spaced holes for bowls, according to Dörpfeld's conjecture, for fixing a wainscoting of wooden planks. Fragments of a great bath-tub

the men's apartment m (megaron), a rectangle 38.7 by 32.2 ft., characterized alike by its size as well as by its preferred location on the highest point of the rock of the citadel, and accessible from the court through a portico and a separate vestibule. Four columns supported the ceiling of the hall, at whose centre, in conformity to the statements of Homer, is found a circular structure, probably the hearth.

The dwelling of the women is on the east of the men's apartments, but it is not in direct connection with them. It exhibits a plan corresponding to that of the men's dwelling, though simpler; first a court, then a portico, from which one passes directly into the hall, and by side doors into the adjoining passages. The women's apartment has an area of about 462 sq. ft.; a hearth appears to have existed at the centre, just as in the men's hall. The floor consists of a coating of lime. In the southwest angle, remains of the ancient stucco on the wall with painted decorations, have been found in place.

The purpose of the numerous other apartments of the Palace is not so assured as that of those mentioned. A series of rooms , accessible by passages and vestibules, lies in the northeast angle; in these should be recognized the sleeping apartments, and also perhaps the armory and treasury of the ruler. Two narrow adjoining rooms on the north side of the court, according to Dörpfeld's conjecture, contained the stairway to the roof, or to a possible upper story. From the court before the women's hall, one passes further southward to a third court. This, with all adjoining apartments, may have served for housekeeping purposes, and the rooms lying next the front gateway for the quarters of the guard and watch at the gateway. -- Another and in part badly ruined group of apartments adjoins the men's hall and its court on the west. Only one room of these may be determined with certainty, the bathroom o, whose floor consists of a single enormous slab of stone, 9.84 ft. w wide, 13.2 ft. long and 2.3 ft. thick, with a total weight of about 22 tons. On the raised margin of the stone, which has a channel for carrying off the water, are regularly spaced holes for dowells, according to Dörplefd's conjecture, for fixing a wainscoting of wooden planks. Fragments of a great bath-tub

of ship have been found, which stood in the room. The location of the bathroom is in the vicinity of the mess's mess, and its convenient connection with the mess-room certainly agrees with the present custom, also mentioned by Homer, of from visiting in part the refreshment of the bath to the coming stream, before he was received at the hospitable hearth.

The lines of the walls of concreted stone rise but little above the ground; we frequently find only three-foot and vestiges of their location; in other places, we still see on the external surface the clay coating up to 8.15 inches thick, covered [illegible] ora. The few remains of building stones (unworked) make it probable, that the superstructure was built of wood and unburned bricks.[1]

1. In the mode of building still common today in the Peloponnesus, and especially in the district of Tiryns, with unburned bricks and wooden uprights, the enclosing masonry usually stands on a course of quarried stones, to protect the perishable material from water and from the dampness of the ground."

The painted stucco on the walls, with its rosettes and spiral forms (see colored plate II) and other ornamentation, indicate Egyptian art, and so the same source is also to be referred the decoration of a frieze pattern by inlaid strips and beads of blue glass.[2] Not with these occur also primitive ornamental forms peculiar to the country; the heart-leaf, the ivy leaf, and the so-called wave ornament. The latter may indeed be native among all peoples in all parts of the world, inhabiting the shores of the sea, as has been shown. (Similar frieze patterns are also found at Vyeneas, on terra cottas in Unossos, and on some stone friezes there.

[illegible] the external appearance of the Palace in their work.(See Vol. 2, Pl. 8. Courtyard view of the citadel). In the Abendmusen of the Bavarian Akademie der Wissenschaft, Heger and Bohlmann see himself in Arbres Mitt. (1890) in the series, that the ceiling [illegible] indeed be termed probable. They assume that roofs of earth

of clay have been found, which stood in the room. The location of the bathroom is in the vicinity of the men's court, and its convenient connection with the magaron certainly agrees w with the ancient custom, also mentioned by Homer, of first giving in part the refreshment of the bath to the coming stranger, before he was received at the hospitable hearth.

The lines of the walls of quarried stone rise but little above the ground; we frequently find only thresholds and vestiges of their location; in other places, we still see on the external surface the clay coating up to 3.15 ins thick, covered by neatly smoothed lime plaster, partly with painted decorations. The few remains of building stones (quarried) make it p probable, that the superstructure was built of wood and unburned bricks. [1]

*1. In the mode of building still common today in the Peloponnessus, and especially in the vicinity of Tiryns, with unburned bricks and wooden anchors, the enclosing masonry usually stands on a course of quarried stones, to protect the perishable material from water and from the dampness of the ground.*

The painted stucco on the walls , with its rosettes and spiral forms (see colored plate II) and other ornamentation, indicate Egyptian art, and to the same source is also to be referred the decoration of a frieze pattern by inlaid slips and beads of blue glass.[2] But with these occur also primitive ornamental forms peculiar to the country; the heart-leaf, the ivy leaf, and the so-called wave ornament. The latter may indeed be native among all pepoles in all parts of the world, inhabiting the shores of the sea, as has been shown. (Similar frieze patterns are also found at Mycenae, on terra cottas in Cnossos, and on some stone friezes there.

Perrot and Chipiez have endeavored to give a general view of the external appearance of the Palace in their work.(See Vol. 6. Pl. 8. Southeast view of the citadel). In the Abhandlungen of the Bavarian Akademie der Wissenschaft, Reber and Bühlmann make the same attempt.(1896). Concerning both, Dörpfeld expresses himself in Athena Mitt. (1899) in the sense, that the restoration of Perrot-Chipiez "comes nearest the truth -- should indeed be termed probable. They assume flat roofs of earth

and generalized walls as in Mycenae. Much stone and large
[illegible] Dikaios architect [illegible] a [illegible]
of the problem (in Buchenbach's Kunst und Gesschichte, 1908, p.
[illegible]) by continuous terrace walls and closed passport walls. Pro-
fessor Dörpfeld, the gifted restorer of ancient architectural
monuments, sketches the interior and exterior of the Palace in
a rather too refined manner. He skillfully combines the Lycian
terrace roof above the round trunks of the ceiling and the si-
de structures with the Greeian table of the megaron. He assu-
mes for the friezes, as a characteristic ornamentation there, the
alternating vertical supports with the palm-leaves adjacent on
both sides, as they are expressed as a plinth in Tiryns, as f
fragments of stone friezes in Mycenae and Knossos, and also at
the last place on the larger pottery fragments of apparently
the Minoan period.

The excavations undertaken in Mycenae in 1922 by the Greek
[illegible] brought to light a second royal palace with a plan similar to
that at Tiryns. The arrangement of the [illegible]
[illegible] of the round hearth. These objects, as well as the exist-
ence of a [illegible] with [illegible] for the [illegible]
and the [illegible] of the [illegible] [illegible] [illegible]
we have carefully examined.

1. The [illegible] by Karl [illegible] Reisen und Untersuchungen in Troja
Berlin, 1. [illegible]. Berlin and [illegible] Tiryns
[illegible] 9, [illegible] 9. [illegible] [illegible]
citadel -- a southeast view and a view of the northwest side.
[illegible] view of Tiryns.

The remains are shown by the corresponding plan of the cita-
del.[2] or which may be recognized the location of the court, of
[illegible] and the stairway (Ge mal) previous
ved at-pa). As at Tiryns, the plan of the building is only de-
termined by a few courses of stone projecting above the ground.[3]

and crenelated walls as in Messene. Much stone and little bread! Likewise architect Restle attempts a nearer solution of the problem (in Luckenbach's Kunst und Geschichte, 1902, p. 5) by continuous terrace roofs and closed parapet walls. Professor Bühlmann, the gifted restorer of antique architectural monuments, sketches the interior and exterior of the Palace in a rather too refined manner. He skilfully combines the Lycian terrace roof above the round trunks of the ceiling and the side structures with the Grecian gable of the megaron. He assumes for the frieze, as a charactistic ornamentation there, the alternating vertical supports with the palm-leaves adjacent on both sides, as they are expressed as a plinth in Tiryns, as f fragments of stone friezes in Mycenae and Cnossos, and also at the last place on the larger pottery fragments of apparently the Minoan period.

The excavations undertaken in Mycenae in 1886 by the Greek Archaeological Society under the supervision of Tsountas [1] brought to light a second royal palace with a plan similar to that at Tiryns. The apartment of the one palace designated as the megaron is repeated in approximately the same dimensions, with its arrangement of portico, vestibule, of the men's hall with the four marks of the location of columns and the vestiges of the round hearth. These objects, as well as the existence of a threshold of breccia with four holes for the jambs and the limestone floor slabs of the vestibule, injured by fire, we have ourselves examined.

1. See Geschichte der Kunst aller Zeiten und Völker by Karl Woermann. Vol. 1. 1900. Perrot and Chipiez also give for the Palace in Mycenae (vol. 6, pls. 9, 10) two restorations of the citadel -- a southeast view and a view of the northwest side. Both exhibit crenelated walls and flat terrace roofs for the view of Tiryns.

The remains are shown by the corresponding plan of the citadel,[2] on which may be recognized the location of the court, of some subordinate apartments, and the stairway (20 well preserved steps). As at Tiryns, the plan of the building is only determined by a few courses of stone projecting above the ground.[3]

8. See Schuchhardt, p. 312 to 320, Pl. 5.

9. Under these conditions, a fatal impression is made on those acquainted with the site of the building, and a misleading one on the reader, only identified in accordance with the report, since in the illustrations these are represented as [illegible]. [illegible] Schuchhardt, for example, describes (p. 321-324) wooden beams "as in the walls of Troy," -- "the roof supported by four wooden columns," -- "and what is true for the plan (preferring to Mycenae) is likewise true for the superstructure; everywhere the most striking agreement with the palace in Tiryns. Floors, doorways, doors, walls, thresholds, roof, everything is exactly as there." -- But there is nothing left of the columns, doorways or roof, as we have stated, and there are also no longer any beams in Troy! Now if it be stated even (p. 324), that the mural paintings are richer in one place than in the other, rather too much is still demanded from the reader.

[illegible] passages in the walls, like those at Tiryns, and which are covered by sabbers corbelled out. Others are horizontally covered, so that in some places, the horizontal covering alternates with a corbelled one. In connection with these, a similarly constructed passage 4.25 ft. wide leads down about 30 steps to a cistern. The very rough and irregularly dressed walls and ceilings are here covered by a coat of whitish-gray stucco 1.12 ins. thick, which follows the rough surface of the sabbers. The appearance recalls that of certain grottos of the late Hellenistic age, where the rock-work is made of stucco and cement mortar.

We may well assume in Tiryns a similar coating on the surfaces of walls and ceilings of similar passages in the walls. The use of these passages for storing provisions and for communication by men and animals, thus becomes more probable.

That Schliemann and Dörpfeld began in Mycenae, according to [illegible] and more scientifically.

[illegible] carried back to the middle of the second thousand years before our era (entire absence of iron articles in the finds leads to

*2. See Schuchardt. P. 319 to 329. Pl. 5.*

*3. Under these conditions, a fatal impression is made on those acquainted with the site of the building, and a misleading one on the reader, only deciding in accordance with the report, since in the illustrations things are represented as as existing, which are actually no longer preserved. Schuchhardt, for example, describes (p. 321-324) wooden beams "as in the walls of Troy,"-- "the roof supported by four wooden columns," -- "and what is true for the plan (referring to Mycenae) is likewise true for the superstructure; everywhere the most striking agreement with the Palace in Tiryns. Floors, doorways, posts, thresholds, roof, everything is exactly as there." -- But there is nothing left of the columns, doorways or roof, as we have stated, and there are also no longer any beams in Troy! Now if it be stated even (p. 324), that the mural paintings are richer in one place than in the other, rather too much is still demanded from the reader.*

On the northwest slope of the hill of Mycenae have been found passages in the walls, like those at Tiryns, and which are covered by ashlars corbelled out. Others are horizontally covered, so that in some places, the horizontal covering alternates with a polygonal one. In connection with these, a similarly constructed passage 4.26 ft. wide leads down about 50 steps to a c cistern. The very rough and irregularly dressed walls and ceiling are here covered by a coat of whitish-gray stucco 1.18 ins. thick, which follows the rough surface of the ashlars. The appearance recalls that of certain grottos of the late Renaissance, where the rock-work is made of stucco and cement mortar.

We may well assume in Tiryns a similar coating on the surfaces of walls and ceilings of similar passages in the walls. The use of these passages for storing provisions and for occupation by men and animals, thus becomes more probable.

What Schliemann and Dörpfeld began in Mycenae, according to K. Woermann, Chr. Tsountas has extended more systematically a and more scientifically.

The civilization at Mycenae and Tiryns is now generally referred back to the middle of the second thousand years before our era (entire absence of iron articles in the finds leads to

[illegible] opinion), and then the [illegible] of the [illegible] [illegible] may be accepted as correct.

The excavations in the rubbish heaps of Hissarlik (Wilk. 26) have brought to light an enclosure of fortifications of small extent (one-third as large as those at Tiryns), generated by strong gateways and narrow towers, enclosing fragments of different buildings. Schliemann recognizes in them the fortress of Priam, the citadel and palace of the ruler of the Troy of Homer, and his opinion is shared at this time by influential savants. 1

1. For the different views, see the writings of Rottiaer, especially: "Hissarlik, wie es ist." Rhetes Sammlerbeim [illegible] Berlin. 1881. [illegible] [illegible] 1. 1884. Berlin. [illegible] 1. [illegible] [illegible] Ilios. Leipzig, Brem. Aus Homer zu Troja. Berlin. 1886.

A sufficient representation of the walls is further given by Rottiaer in his statement: "One breaks himself to the remaining outer portion of the mound of rubbish, from which he looks down, as if into a crater. The best place is above the [illegible] [illegible] is Schliemann's acropolis of Troy! The terrace consists of [illegible] the ground."

We give in Figs. 23 and 24 views from our own drawings on the spot, and also the ground plans of Schliemann in Figs. 25 a and 26 for further information, and from these it appears, that a rampart covered by great polygonal blocks of stone leads up to one so-called southwest gate, which by its design recalls Etruscan city gates. Within the enclosing walls are three two partial rectangular rooms, separated from each other by a narrow intervening room, enclosed by numerous bricks and subdivided in depth by cross walls, which chiefly attract our attention and recall similar walled structures on the areas of the citadels of Tiryns and of Mycenae, where they are recognized as the apartments of the men and of the women. The same applies to the superstructure, that has been said in reference to the palaces in the Acropolis already mentioned. Perhaps the representations of the Byrnonis may afford some starting points

this opinion), and thus the fixing of the destruction of the palaces there at the time of the Doric immigration (1100 B.C.) may be accepted as correct.

The excavations in the rubbish heaps of Hissarlik (Fig. 23) have brought to light an enclosure of fortifications of small extent (one-third as large as those at Tiryns), defended by strong gateways and narrow towers, enclosing fragments of different buildings. Schliemann recognizes in them the fortress of Priam, the citadel and palace of the ruler of the Troy of Homer, and his opinion is shared at this time by influential savants. [1]

*1. For the different views, see the writings of Bötticher, especially ; "hissarlik, wie es tat." Fünftes Sendschrieben über Schliemann's Troja. Berlin. 1890. Also Kunstchronik z. Zeit. f. Bild. Kunst. 1890. P. 242-254. Further, Schliemann. Ilios. Lastly, Durm. Zum Kampf um Troja. Berlin. 1890.*

A sufficient representation of the whole is indeed given by Bötticher in his statement;: "One betakes himself to the remaining outer portion of the mound of rubbish, from which he looks down, as if into a crater. The best place is above the so-called southwest gate. He sees a polygonal terrace, which is Schliemann's acropolis of Troy! The terrace consists of rubbish criscrossed by walls down to the original surface of the ground."

We give in Figs. 23 and 24 views from our own drawings on the spot, and also the ground plans of Dörpfeld in Figs. 25 a and 26 for further information, and from these it appears, that a ramp covered by great polygonal slabs of stone leads up to the so-called southwest gate, which by its design recalls Etruscan city gates. Within the enclosing walls are first two parallel rectangular rooms, separated from each other by a narrow intervening room, enclosed by unburnt bricks and subdivvded in depth by cross walls, which chiefly attract our attention and recall similar walled structures on the areas of the citadels of Tiryns and of Mycenae, where they are recognized as t the apartments of the men and of the women. The same applies to the superstructure, that has been said in reference to the two palaces in the Argolis already mentioned. Perhaps the representations on the Francois vase afford some starting points

for a reconstruction, though the sample and foundation-wall [illegible] are well worth of artistic criticism. Similarly similar are the widths of the rooms A and B of the plan to those corresponding in Figure.

In the book "Ancient Lake-Dwellings [illegible]" Dr. Keller gives as the building materials employed for the palaces, limestone, air-dried bricks and wood, together with roofs of earth. He further states:-

1. Troja und Ilion. Results of the excavations in the prehistoric and historical strata of Ilion. [illegible] Leipzig. Ath[illegible]. Reco & Barth. 1902.

Whether the earthen roofs were preceded by such roofs of ornamentary reeds or shingles without a layer of earth is uncertain. Those certainly presume a steep surface of the roof. But it is safer to assume an earth roof with slight fall toward all four sides of the building, where the layer of earth did not rest directly on the beams, but rather on a basis of reeds. (Roofing tiles of clay and marble date from the time of Roman predominancy. In the [illegible] period, [illegible] bricks and wood are shown in all periods of the citadel, the clay bricks being with and without chopped straw. Wood was employed as ties in the masonry, parallel and perpendicular to the enclosing walls. For the foundations was preferred built stone and air-dried bricks for the upper story.

Dörpfeld distinguishes between the following [illegible] in Ilion:

a. The earliest settlement.

b. The prehistoric citadel of Troja (its very [illegible] internal buildings).

c. Three subsequent prehistoric settlements.

d. The Troja of Homer,-- a Mycenaean citadel.

e. Two settlements preceding the Greeian.

f. The Greeian Ilion or Troja and [illegible] of Ilion. Tiles.

g. The acropolis of the Roman city Ilion. Temple of Athena with dedicatory inscriptions. [illegible] Temple of Ilion [illegible] Ilion [illegible].

for a reconstruction, though the temple and fountain-house represented thereon do not exhibit gable roofs, but rather straw and clay roofs of slightly cylindrical curvature. Singularly similar are the widths of the rooms A and B of the plan to those corresponding in Tiryns.

In his book [1] comparing the results of the excavations, Dörpfeld gives the building materials employed for the palaces, limestone, air-dried bricks and wood, together with roofs of earth. He further states:-

*1. Troja und Ilion. Results of the excavations in the prehistoric and historical strata of Ilion. 1870-1894. By W. Dörpfeld. Athens. Beck & Barth. 190x.*

Whether the earthen roofs were preceded by such made of ordinary reeds or shingles without a layer of earth is uncertain. Those certainly presume a steep surface of the roof. But it is safer to assume an earth roof with slight fall toward all four sides of the building, where the layer of earth did not rest directly on the beams, but rather on a basis of reeds. (Roofing tiles of clay and marble date from the time of Roman possession). On the other hand, porous limestone, unburnt clay bricks and wood are shown in all periods of the citadel, the clay bricks being with and without chopped straw. Wood was employed in the construction of supports, ceilings, roofs, and as ties in the masonry, parallel and perpendicular to the enclosing walls. For the foundations was preferred split stone and air-dried bricks for the upper story.

Dörpfeld distinguishes between the following periods in his work.

a. The earliest settlement.

b. The prehistoric citadel of Troja (its most important i internal buildings).

c. Three subsequent prehistoric settlements.

d. The Troja of Homer,-- a Mycenaean citadel.

e. Two settlements preceding the Grecian.

f. The Grecian Ilion -- Temple and precinct of Athena Iliar.

g. The acropolis of the Roman city Ilion. Temple of Athena with dedicatory inscription, the great altar, small round Temple over the well, the Bouleuterion and the Theatre.

cenean period. (Fig. 26).

Of the former it is to be said in explanation:- We there passed from a tore-court through the gateway II C into a gravelled second court, on which must have stood the great megaron II A without columns but furnished with an antechamber, held by it being the megarons II B and II D, joined to which was another II E. "All these buildings appear to have had open colonnades towards the court." The structure II F was at first held to be a temple, "since its plan is similar to that of the minoan Gerolian temple." Does the plan for the temple in the pre-Mycenaean period seem to have been assumed as assured? More correct must be the designation applied to similar rooms found in the excavations at Tiryns and Mycenae, especially in reference to their similar size. But the critical discussions can no longer be postponed (see p. 88), and those drawn by Dörpfeld are arbitrary assumed by him, about which it is known, that concerning the "rear end of the building, one is still less informed," and likewise the former arrangement of the "totally half" cannot be settled. Actually and theoretically with little basis or properly with none at all, not much is to be commenced with the ground plan, when further in principle the division into different building periods cannot be attempted; for just as little as Rome, was Troja not built in a day, and by growth

same procedures occurred from the earliest time until the present day, that the old must give place to the new, and that only in time did the form of the city change in magnitude and in-

story of each architectural structure, but one must understand it only even those of Homeric Troja do not tell us. (See text

h. The Grecian and Roman lower city and the water supply.

Of these periods only those placed under b and d here have a technical interest, i.e., the most important internal structures of prehistoric Troy (Fig. 25) and the citadel of the Mycenaean period.(Fig. 26).

Of the former it is to be said in explanation:- We there passed from a fore-court through the gateway II C into a graveled second court, on which must have stood the great megaron II A without columns but furnished with an antedrom, hard by it being the megarons II E and II B, joined to which was another II H. "All these buildings appear to have had open anterooms toward the court." The structure II B was at first held to be a temple, "since its phantisnsimilar to that of the simplest Grecian temple." Does the plan for the temple in the prehistoric period seem to have been assumed as assured? More correct must be the designation applied to similar rooms found in the excavations at Tiryns and Mycenae, especially in reference to their similar size. But the original dimensions can no longer be determined (see p. 85), and those drawn by Dörpfeld are arbitrarily assumed by him, about which it is known, that concerning the "rear ending of the building, one is still less informed," and likewise the former arrangement of the "stately hall" cannot be settled. Actually and technically with little basis or properly with none at all, not much is to be commenced with the ground plan, when further in principle the division into different building periods cannot be attempted; for just as l little as Rome, was Troja not built in a day, and by growth or also by extension after the destruction of each city, the same procedures occurred from the earliest time until the present day, that the old must give place to the new, and that only in time did the form of the city change in magnitude and importance. To learn to distinguish between the earlier and later works is the problem of the Epigones. The stones tell the story of each architectural structure, but one must understand their speech. Much more than the discoveries of the prehistoric city even those of Homeric Troja do not tell us. (See Text volume I, p. 107 et seq.). We learn that here also good tertiary limestone without mortar was carefully and even more care-

eastern walls of the citadel down to the foundations.(See 3, 180 and fig. 26, the great tower of the 6 th layer (a). According to the indications on the plan and the rather broadly expressed text, we first have to do with a megaron, also without columns and with an anteroom, its hall 26.80 by 27.20 ft., that must likewise have influenced the temple plan of the ancient Greeian period. (VI a). Then with a second megaron built of small limestone blocks (VI b), of which it is doubtful, whether the interior received daylight through the door alone or through windows. A support of the ceiling and of the roof by wooden columns is termed "entirely improbable." Further with the structure (VI M) consisting of several adjacent rooms, of whose purpose not much can be said; then with the buildings (VI G) and (VI H), about which nothing further can be determined, and finally with the great hall (VI O) 50.10 by 27.56 ft., only one of which is proved. The two others are merely sketched in, "so that the column form a middle row" and obtaind thus beer the ceiling.(!). This singular evidence is similar to other previous cases. On the single power foundation stone discovered, and wrought in the same block with it, rises a slightly conical base 0.92 ft. high and 2.02 f.. in lower diameter, that a column of only 1.38 ft. diameter and like of wood stood thereon. The building "may have been a temple," which considering were found no temples of that period.

follows:-

A massive enclosing wall with a superstructure of air-dried bricks and small limestone blocks, that is fixed by strong

the citadel. A certain number of the internal structures have

carelessly wrought, that unburnt bricks and wood were employed for the structures, and that it was possible to lay bare the eastern walls of the citadel down to the foundations.(See 6, the 6 th layer, Mycenaean citadel, the Troja of Homer. P. 144-150 and Fig. 26, the great tower of the 6 th layer (g). According to the indications on the plan and the rather broadly expressed text, we first have to do with a megaron, also without columns and with an anteroom, its hall 29.86 by 37.80 ft., that must likewise have influenced the temple plan of the ancient Grecian period. (Vi a). Then with a second megaron built of small limestone blocks (VI b), of which it is doubtful, whether the interior received daylight through the door alone or through windows. A support of the ceiling and of the roof by wooden columns is termed "entirely impossible." Further with the structure (VI M) consisting of several adjacent rooms, of whose purpose not much can be said; then with the buildings (VI G) and (VI F), about which nothing further can be determined, and finally with the great hall (VI C) 50.19 by 27.56 ft., that has an anteroom, and whose ceiling was supported by 3 columns, only one of which is proved. The two others are merely sketched in, "so that the columns form a middle row" and could thus bear the ceiling.(!). This singular evidence is similar to other previous cases. On the single rougr foundation stone discovered, andewrought in the same block with it, rises a slightly conical base 0.92 ft. high and 2.03 ft. in lower diameter. By the weathering of the surface, it is to be recognized that a column of only 1.25 ft. diameter and also of wood stood thereon. The building "may have been a temple," which possibility Dörpfeld is unwilling to reject, although in Tiryns and Mycenae were found no temples of that period.

Various arrangements of walls are to be distinguished, on t the other hand. The final results may then be summarized as follows:-

A massive enclosing wall with a superstructure of air-dried bricks and small limestone blocks, that is flanked by strong and widely projecting towers (Fig. 26). Through at least 3 gateways and one portal could one pass into the interior of the citadel. A certain number of the internal structures have

indeed been discovered in their ruins, but most were entirely

by wide or narrow passages. All buildings were probably ple-

curately determined. According to the pottery found, the buil-

in the period from 1500 to 1000 B.C.

ings of the Homeric period, then we must not be merely satis-

fied with miserable aronitectural works. We must take into

account what the fallen city once contained, which are the tre-

asures found, the pottery, the vessels and tools of metal, of

stone and bone, the works in gold and silver, the mural paint-

ings etc. The first in is enumerated under 90 numbers as the

so-called treasure of Priam (p. 290-293) and comprises objects

of gold and bronze, weapons and ornaments. They are now part-

ly preserved in the Antiquarium at Constantinople and part-

ly in the Museum of Ethnology (Völkerkunde) in Berlin. Accor-

ding to these articles found, the tools were entirely made of

More works in gold and silver were yielded by the buildings

in Tiryns and Mycenae than by those of Ilion. The articles

found in the localities first mentioned are well arranged and

1).:architectural fragments and examples of mural paintings

are in colored plate II. Fig. 27 presents examples from Myce-

nae -- asses walking upright and pulling a rope or bearing a

type:" -- then the so-called flying fishes (Fig. 27) in free and

sharply outlined drawing are represented in flat color tints

on the basis of careful observation of nature. The motive of

the flying fish is also executed in relief on greenish-blue

on the well known fresco piece with a mermaiding with an ox.

indeed been discovered in their ruins, but most were entirely destroyed.(P. 181). The "remaining"(?) structures represent separate houses, that have no common walls and are separated by wide or narrow passages. All buildings were probably placed on terraces. The date of their destruction cannot be accurately determined. According to the pottery found, the buildings belonged in the second half of the second millenium, thus in the period from 1500 to 1000 B.C.

If we desire to optain a correct idea of the artistic creations of the Homeric period, then we must not be merely satisfied with miserable architectural works. We must take into account what the fallen city once contained, which are the treasures found, the pottery, the vessels and tools of metal, of stone and bone, the works in gold and silver, the mural paintings etc. The first is is enumerated under 30 numbers as the so-called treasure of Priam (p. 325-343) and comprises objects of gold and bronze, weapons and ornaments. They are now partly preserved in the Antique Museum at Constantinople and partly in the Museum of Ethnology (Völkerkunde) in Berlin. According to these articles found, the tools were chiefly made of bronze, but besides the double axes, hammers and picks of bronze, stone axes were also found in the 6 th stratum.

More works in gold and silver were yielded by the buildings in Tiryns and Mycenae than by those of Ilion. The articles found in the localities first mentioned are well arranged and preserved in the National Museum at Athens. Representations of some are given in the little vignette of this volume (Fig. 1),;architectural fragments and examples of mural paintings are in colored plate II. Fig. 27 presents examples from Mycenae -- asses walking upright and pulling a rope or bearing a long spirally twisted staff, on which Woermann remarks (p.187), "that the Mycenaean half-ass is the ancestor of the Grecian satyr;" -- then the so-called flying fishes (Fig. 27) in free and sharply outlined drawing are represented in flat color tints on the basis of careful observation of nature. The motive of the flying fish is also executed in relief on greenish-blue vases and in the same free drawing. From Tiryns likewise comes the well known fresco piece with a manejuggling with an ox.

(See Perret-Chipiez, VI, p. 388). From [illegible]
see left of an inset, within an enclosing geometrical border.

[illegible]
that in the good imitations of the "Geissling Metal Works" are to be found in nearly all European museums. Here also belong the wonderful cup of Vaphio, wrought in gold, with the conjured bulls, and then the dagger from Mycenae, represented in color in Perret-Chipiez (VI, pl. 19), the golden face masks for children and adults,[1] the splendid silver bull's head with golden horns, the wonderfully wrought diadems and cups, the numerous golden flower leaves, buds and ornaments for women, the little so-called altars or temples made in sheet gold, that are partly represented in Schliemann etc. I give one of these in natural size from my own sketch and remark thereon, that the three lyre-like forms in the lower panels, drawn by the authors mentioned, are best at right angles and represent the so-called sacred horns, that we shall again find on Greek. On the cross [illegible] small grooved pilasters (see section. Fig. 4a), and the wavy lines on the frieze above the middle part's [illegible] and accordingly are favorite palm-like growth at the right with on plate I of the volume. The sacred horns reappear in [illegible]
it may be concluded, that they were fastened (sewn) on textile fabrics.

1. See Sacken, O. Antike Gesichtsvasen und Gesichtsornamente. Vienna, 1875.

[illegible] see Tsoudis of a house of the Mycenaean period with a great door doorway in the centre, with door and corner posts and closed door leaves, between the posts being sahlar masonry without [illegible] by over each other. Over the lintel of the door round beam [illegible].

(See Perrot-Chipiez. VI. P. 886). From Mycenae is the painted tablet of limestone with the two female figures on the right and left of an idol, within an enclosing geometrical border.

Not sufficiently can the perfected beautiful gold and silver works be emphasized, as well as the chiseled and inlaid weapons, that in the good imitations of the "Geissling Metal Works" are to be found in nearly all European museums. Here also belong the wonderful cup of Vaphio, wrought in gold, with the captured bulls, and then the dagger from Mycenae, represented in color in Perrot-Chipiez (VI, pl. 19), the golden face masks for children and adults,[1] the splendid silver bull's head with golden horns, the wonderfully wrought diadems and cups, the numerous golden flower leaves, buds and ornaments for women, the little so-called altars or temples made in sheet gold, that a are poorly represented in Schliemann etc. I give one of these in natural size from my own sketch and remark thereon, that the three lyre-like forms in the lower panels, drawn by the authors mentioned, are bent at right angles and represent the so-called sacred horns, that we shall again find on Crete. On t the cross rails stand small grooved pilasters (see section, Fig. 28), and the wavy lines on the frieze above the middle part s shown in the illustrations mentioned, represent quite definitely and accurately the favorite palm-like growth at the right and left of the so-called triglyphs, that we became acquainted with on plate I of the volume. The sacred horns reappear in the crown at top. Six of the little altars in sheet gold found in the Museum mentioned exhibit holes in six places, from which it may be concluded, that they were fastened (sewn) on textile fabrics.

*1. See Benndorf, O. Antike Gesichtshelme und Sepulchralmasken. Vienna. 1875.*

A small gold plate, found by Dr. Kuruniotis in Volo, shows the facade of a house of the Mycenaean period with a great do doorway in the centre, with door and corner posts and closed door leaves, between the posts being ashlar masonry without bonded courses, for the end joints of the courses lie vertically over each other. Over the lintel of the door round beam ends mark the wooden ceiling of the higher central apartment,

in truth, hardly may a man convince it."

the man's hall, where fir beams and lofty columns were black-
ened by the smoke of the open fire and of pine-wood torches,
redcoats on the other hand the warlike spirit of the master,
trophies for great animals, weapons, and beasts for slaughter,
rill and valiant, another court surrounded by porticos, bene-
ath whose protecting roofs strangers repose, and in whose
midst stood an altar of Zeus, a women's hall with columns and
adjacent apartments in two stories, are all well arranged to-
laid with silver and ivory; bagles and aroels, covered by
listed by golden lares. Thus walls for defense and offense
commodious rail for lofty country the master, while house rooms-
tores may the wife, and a crowd of serving men and maids help

and the same are above the ashlar work of the side parts, showing these lower ceilings. On these rest the parapet wall of an upper story, above this projecting from from the wall the beginnings of windows. As on the little temples, here are also small round holes at the cornices for fastening the piece on cloth.

*Fig. 29 gives the small plate after an original photograph kindly placed at my disposal by Dr. Kuruniotis in Athens.*

No perceptible fragments of the much besung Palace of Odysseus have been discovered, since the investigations so far made on Ithaca by Schliemann and others [2] have been essentially of a topographical nature; but the remains of an ancient palace near the Erectheion were found after 1887 within the Cyclopean enclosing walls of the acropolis of Athens.(See plan of the acropolis in Deltion archaeologikon. 1889).

"Room succeeds room, and its fore-court is well enclosed by walls and battlements; a gate of two leaves closes strongly; in truth, hardly may a man conquer it."

Thus is the "home" of Odysseus described. The hill of the dung of mules and of cattle before the gate of the court betrays the agricultural pursuits of the owner; the weapons in the men's hall, where fir beams and lofty columns were blackened by the smoke of the open fire and of pine-wood torches, indicate on the other hand the warlike spirit of the master. Stables for draft animals, wagons, and beasts for slaughter, mill and bakery, another court surrounded by porticos, beneath whose protecting roofs strangers reposed, and in whose midst stood an altar of Zeus, a women's hall with columns and adjacent apartments in two stories, are all well arranged together in the citadel. Purple coverings lie on the seats inlaid with silver and ivory; tables and stools, covered by sheepskins, fill the rooms; doors separate the rooms; they are lighted by golden lamps. Thus walls for defense and offense surround the master's seat; agriculture, hunting, war and an occasional raid for booty occupy the master, while house industries busy the wife, and a crowd of serving men and maids help in everything. A display of magnificent vessels, beautiful fabrics, women's handiwork, embroideries and woven fabrics is

the wall assemble.

[illegible] Arthur Evans, [illegible] Minoan Civilization, Antiquity [illegible] 47 ff.; -- see the essays of Ofenfield and the corresponding essay essays, also Iliaque in Grande, by A.S.J. Goetzoo, Athens, 1908, which moreover have only a purely archaeological interest.

1. The restoration of a Greeian palace of the time of Homer and according to the Odyssey was attempted by Chipiez (Perrot-Chipiez. VII, pl. 60), regarding which it is stated in the accompanying note I (p. 81): "The best plan of the palace of Ulysses ever given appears to be to be that made by Jeep, in his interesting study entitled, "Die Burgerto Zouse in relation to [illegible] at Tiryns," [illegible] Berl. Ausgrav. Jahr. [illegible] 1888). On plate 2, Perrot and Chipiez give a bird's eye view of the uncovered palace (i.e., the rooms without ceilings and roofs), which the plan of the building makes easily intelligible. Also see the ground plans of Jeep in Fig. 25 (p. 45) of this volume."

Additional and richer materials from the Mycenaean and from the still earlier period of Aegean art are presented by the new excavations on Crete.

Arthur J. Evans[2] assumes a centralized and dynastic state between neolithic civilization and the Greeian colonization of the "geometrical epoch" for the great prehistoric civilization in Crete, and he takes for the three periods:-

3. See his essay, "Systems de classification des ecoques successifs de la civilisation minoenne. Athens. Petrosos.

1. An early Minoan period (Ancien Minoenne primitive) with the following subdivisions; a sub-neolithic, when there predominate vessels polished by hand, of blackish or whitish ground color with white or brown drawings, then one similar but more advanced, and a third with a further development of the above functions, with the addition of the clay articles of the Egyptian [illegible] Age. [illegible] by Mise Boyd in Gournia.

2. [illegible] Minoan Civilization [illegible], which three subdivisions, in the first of which belong the ves-

made on occasion; in a large hall for drinking and weapons, the men assemble. [1]

*2. See Schuchhardt. P. 341. Further, Dörpfeld now no longer seeks the home of Odysseus on Ithaca, but on the island of Leukas; -- see the essays of Dörpfeld and the corresponding opposed essays, also Ithaque la Grande, by A.E.H.Goekoop, Athens, 1908, which moreover have only a purely archaeological interest.*

*1. The restoration of a Grecian palace of the time of Homer and according to the Odyssey was attempted by Chipiez (Perrot-Chipiez. VII, pl. 80), regarding which it is stated in the accompanying note 1 (p. 81); "The best plan of the Palace of Ulysses ever given appears to us to be that made by Jebb, in his interesting study entitled, "The Homeric House in relation to the Remains at Tiryns." Jour. of Hell. Studies. 1886. P. 170-188). On plate 2, Perrot and Chipiez give a bird's eye view of the uncovered palace (i.e., the rooms without ceilings and roofs), which the plan of the building makes easily intelligible. Also see the ground plans of Jebb in Fig. 25 (p. 45) of this volume.*

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*2. See his essay, "Systeme de classification des epoques successifs de la civilization Minoenne. Athens. Petracos.*

1. An early Minoan period (Epoque Minoenne primitive) with the following subdivisions; a sub-neolithic, when there predominate vessels polished by hand, of blackish or whitish ground color with white or brown drawings, then one similar but more advanced, and a third with a further development of the above mentioned, with the addition of the clay articles of the geometrical style with the first beginnings of polychromy, found by Miss Boyd in Gournia.

2. A middle Minoan period (Epoque Minoenne moyenne), again with three subdivisions, in the first of which belong the ves-

vessels found in the pillar rooms of the Palace at Knossos, w

style," the clay articles being transferred to the third, in which the polychromy had disappeared mostly. In its place co- our beautiful white drawings on a lilac ground, and the reign of Knossos, as well as the use of hard materials for seals.

3. The end is formed by the third and last period (Dennis Poyne Minoans, Late Minoan), again with the subdivisions, the first of which shows vessels with a yellowish or a whitish ground, on which are white, blue or reddish , sometimes very naturalistic drawings. The Palace of Agia Triada belongs to this period, as well as the great restoration of the Palace at Knossos (the so-called throne hall). The great catastrophe of 1500 B.C.

The articles found in the tombs of the acropolis of Mycenae chiefly belong to this time. To the third subdivision are re- ferred the tombs of Vafa Vapoura near Knossos, vases and weap- ons of bronze, goldsmith's work and ivory reliefs. Everywhere is noted the decadence of art activity. It is the time of the greatest diffusion of Mycenaean art, about the end of which the lands about the Aegean were again settled.

in the customs by an increased crossing of robbers with the p

the use of horseboxes became common, though still without an

ace remained entirely abandoned and desolate.

under the government of the traditional King Minos, according to what has already been said by the excavations at various places on the island, gives no starting points for the form, the decoration and arrangement of the palaces of the ruler, or of the dwellings and tombs. We likewise obtain conclusions re- lating to the building materials employed, the structural de- tails,and the tools used in construction. Whatever can still be traced in the course of the walls in Knossos, Agia Triada, Phaestos and in Gournia -- to which chief places we must here

vessels found in the pillar rooms of the Palace at Cnossos, w while the second comprises those of the so-called "Camares style," the clay articles being transferred to the third, in which the polychromy had disappeared mostly. In its place occur beautiful white drawings on a lilac ground, and the faience of Cnossos, as well as the use of hard materials for seals.

3. The end is formed by the third and last period (Dernier Epoque Minoenne, Late Minoan), again with the subdivisions, the first of which shows vessels with a yellowish or a whitish ground, on which are white, blue or reddish , sometimes very naturalistic drawings. The Palace of Agia Triada belongs to this period, as well as the great restoration of the Palace at Cnossos (the so-called throne hall). The great catastrophe of the second Palace at Cnossos marks the end of the period about 1500 B.C.

The articles found in the tombs of the acropolis of Mycenae chiefly belong to this time. To the third subdivision are referred the tombs of Zata Papoura near Cnossos, vases and weapons of bronze, goldsmith's work and ivory reliefs. Everywhere is noted the decadence od art activity. It is the time of the greatest diffusion of Mycenaean art, about the end of which the lands about the Palace were again settled.

In the following periodoccurred at Cnossos a great change in the customs by an increased crossing of robbers with the p population. Iron replaced bronze, cremation succeeded burial, the use of hornbooks became common, though still without an example in the tombs of this period. The vicinity of the palace remained entirely abandoned and desolate.

This poor and final stage of the blooming period of Crete under the government of the traditional king Minos, according to what has already been said and by the excavations at various places on the island, gives no starting points for the form, the decoration and arrangement of the palaces of the ruler, or of the dwellings and tombs. We likewise obtain conclusions relating to the building materials employed, the structural details,and the tools used in construction. Whatever can still be traced in the course of the walls in Cnossos, Agia Triada, Phaestos and in Gournia -- to which chief places we must here

limit ourselves -- however, what the rich Museum in Candia under charge of Dr. Hazzidakis offers with its rich contents, cannot remain unnoticed, since it in part forms the starting point for the fortress palaces of Argos and for sacred Ilion.

The excavations carried on with great expenditures by the Director of the Ashmolean Museum at Oxford, but not entirely completed for lack of funds, afford us the greater example of a princely residence of the time mentioned. The name of Minos has slight bearing on the matter. What is presented to the observer is much and little, and it would be far less, had not such full concessions been made to modern "protection of monuments." One unwillingly asks himself for whom these structures were erected? Only too soon will he realize what he has and what he has forever lost. To render possible a representation of the original for some tourists, too much has been done. Much might be thereby excused, that structural works become necessary to support the falling parts; but novelties like a stairway extending through several stories with stone steps on impossibly shaped wooden columns, where furthermore scarcely one stone is ancient and genuine, must be too much. "O Solomon, I have surpassed thee," may the learned Englishman assert with satisfaction in reference to the executors of similar experiments on this side of the Alps.

On the site, no mighty stone walls and towers stare at us -- merely a lightly constructed outlook tower now rises with an elevated English flag, on the field of the excavations, not exactly to enhance the harmony, yet explaining the orientation to the earnest man as well as to the archaeological lounger. -- The Palace was an open structure, indicating assured possession, in a rich landscape with a view of the blue sea at an hour's journey, and of the snow-capped peak of Mt. Ida.

The centre of the plan (Fig. 30, the ground plan) is formed by an open court 95.15 ft. wide and approximately 229.66 ft. long, not surrounded by halls but paved with stone slabs, upon which open a part of the rooms on the longer eastern and western sides. The entrance is at the northern end through a gateway, with a guard house and open halls with two aisles on the left and right of the entrance street. Eleven pier bases of

the hall were found. At right angles to this plan we find two great flights of steps, that are arranged about a standing corner of the wall, and indeed so that the smaller one turns to a terrace on the right, the other being perpendicular to this, now ascending by 13 convenient steps to the same terrace. The stairway had fallen and is in great part rebuilt anew. (Figs. 81, 82), a first gift for deciding on the grandeur of the plan! Parallel to this court is a second one arranged for the western buildings, that can be reached by a propylion from the eastern side, or likewise through an open hall of the western portico. The western buildings of the great court fall into two halves, that are separated by a narrow passage paved with dark gypsum slabs, glittering in the sun. On the left of this are arrangeso narrow and deep storerooms with peculiar arrangements in t the floors, which with their strong encircling walls lie next ter number of rooms of a different kind, among which are the that opens to the great court by four doorways, the "throne " seat" and the bench seats being the most notable objects.

and were reproduced as half-tones in the "Annual of British School at Athens"(No. 6, session of 1899-1900. London. P. 87, 88). The view on p. 9 also shows the bath structure and the continuous slope leading down to the vestibule. The plain sim-

Interesting arrangements in the ground plan are presented by the complex group of structures on the east of the great court.

with small risers and wide treads, and the second is more than contrasts, in contrast to what Greeian and Roman antiquity produced in this respect. The rise is 6.12 ins. and the tread is 12.80 ins. A view of the flight of steps and of the inter-

the hall were found. At right angles to this plan we fing two great flights of steps, that are arranged about a standind corner of the wall, and indeed so that the smaller one turns to a terrace on the right, the other being perpendicular to this, now ascending by 19 convenient steps to the same terrace. The stairway had fallen and is in great part rebuilt anew. (Figs. 31, 32), a first gift for deciding on the grandeur of the plan! Parallel to this court is a second one arranged for the western buildings, that can be reached by a propyleion from the eastern side, or likewise through an open hall of the western portico. The western buildings of the great court fall into two halves, that are separated by a narrow passage paved with dark gypsum slabs, glittering in the sun. On the left of this are arranged narrow and deep storerooms with peculiar arrangements in t the floors, which with their strong enclosing walls lie next the western court, while on the east of these are found a greater number of rooms of a different kind, among which are the so-called "throne hall with bath," the lower lying vestibule, that opens to the great court by four doorways, the "throne seat" and the bench seats being the most notable objects.

Two views of this room with a great vase in the fore-ground, photographed before the singular restoration, are authentic a and were reproduced as half-tones in the "Annual of British School at Athens"(No. 6, session of 1899-1900. London. P. 37, 39). The view on p. 9 also shows the bath structure and the continuous stepssleading down to the vestibule. The plain simplicity of this view has a good effect.

Interesting arrangements in the ground plan are presented by the complex group of structures on the east of the great court, sloping down toward the Karatos, and by its terraced design. The stairway is in the first place there with light court and its columnar passages on two sides. The steps are arranged with small risers and wide treads, and the ascent is more than comfortable, in contrast to what Grecian and Roman antiquity produced in this respect. The rise is 5.12 ins. and the tread is 18.90 ins. A view of the flight of steps and of the intermediate wall is given by Figs. 31 and 32 (from a commercial photograph by O. Maraghiannis in Candia), concerning which it

must be stated, that it does not at all represent their coordination directly after the excavations. Of the restoration extending through several months, the colored view taken on the spot (plate 5) gives an idea, after an original drawing of my friend Aristides Zembos, who accompanied and assisted me during my last journey. Since stone, as a material, cannot be proved for the upper flight, then is a wooden stairway assumed there, which is not improbable from the kind of marks of fire on the masonry. The form of the supports, their pressure coloring, t the more than singular construction of the steps and the undersides of the flight are inventions of A. G. Evans and his architect. That everything was as it now appears, I cannot endorse, but it may arouse in a layman the conception, that it may have been so. For severe criticism or cleaning, there is too little of the old and too much of the new in the existing structure. It is difficult to come to a correct decision in matters, whose original condition is not visible, where the necessary and the superfluous are interwoven; but if the force, as they still stand before our eyes in the monumental architecture in Moscow, must also be deemed for Pompeii, --and that may well be--, then will the partial restoration, executed at great cost, not fall upon, since uncertain structural forms enter into it, that newly afford opportunity for errors. For example, why are the unfortunate wooden columns in the form of colossal table or chair legs, varnished red and black, when the splendid stone as a material was available in abundance over 9.84 ft. long and 4.92 ft. thick, in the immediate vicinity, and when one remembers that architraves with lengths of but 3.28 ft. were concerned? More on this in the following.

But in the eastern buildings, there is still to be seen further a great hall, divided in length by piers and columns and with a portico before it, and that may pass for an assembly hall, besides this being the so-called "museum of the ocean," with sleeping chamber, bath, privy and drains for removal of rain and sewage. This part of the plan by its training relations with the most interesting in the entire building. Men undertook for to live, as the arrangements prove, and its former occupants are hardly nearer to us than the later Roman knights

must be stated, that it does not at all represent their condition directly after the excavations. Of the restoration extending through several stories, the colored view taken on the spot (plate 3) gives an idea, after an original drawing of my pupil Aristides Zachos, who accompanied and assisted me during my last journey. Since stone, as a material, cannot be proved for the upper flight, then is a wooden stairway assumed there, which is not improbable from the kind of marks of fire on the masonry. The form of the supports, their present coloring, t the more than singular construction of the support of the steps and the underside of the flight are inventions of A. J. Evans and his architect. That everything was as it now appears, I cannot endorse, but it may arouse in a layman the conception, that it may have been so. For severe criticism or checking, there is too little of the old and too much of the new in the existing structure. It is difficult to come to a correct decision in matters, whose original condition is not visible, where the necessary and the superfluous are interwoven; but if the forms, as they still stand before our eyes in the monumental architecture in Mycenae, must also be deduced for Cnossos, --and that may well be--, then will the partial restoration, executed at great cost, not tell much, since uncertain structural forms enter into it, that merely afford opportunity for errors. For example, why are the unfortunate wooden columns in the form of colossal table or chair legs, varnished red and black, when the splendid stone as a material was available in blocks over 9.84 ft. long and 4.59 ft. thick, in the immediate vicinity, and when one remembers that architraves with lengths of but 5.25 ft. were concerned! More on this in the following.

But in the eastern buildings, there is still to be noted further a great hall, divided in length by piers and columns and with a portico before it, and that may pass for an assembly h hall, beside this being the so-called "megaron of the queen," with sleeping chamber, bath, privy and drains for removal of rain and sewage. This part of the plan by its intimacy belongs with the most instructivv vn the entire building. Men understood how to live, as the arrangements prove, and its former occupants are humanly nearer to us than the later born knights

of Tiryns and Mycenae. Further Crete's contribution, turned more to the north, is designated as an "oil press room"-- the wooden tenons in the midst of the floor's pavement --, from which a channel or a groove leads to a lower lying room, in which [illegible] (?). The Palace with its courts, passages and rooms of the most diverse kinds and purposes covered a vast area, that already invites to study. In the complex of walls, living and sacrificial [illegible] there Minos had constructed by Dedalus as a dwelling for the Minotaur. Taken all in all, Knossos has made a gift of the finest case to the archaeological and scientific circles of Europe by the excavation of the Palace, by which men remain indebted in deep gratitude. That received on the whole, it must finally outshine the additions, that caprice and lack of technical knowledge have thrown into the bargain.

[illegible] mode of living of the great in the second millenium B.C. than by many of the earlier discoveries.

That in the repeats and restorations, invention also had a word to say, is indeed intelligible. And that without repeated examinations from different sides, a final result could not be obtained, is also true. Great mistakes or reproductions in favor of preconceived opinions are blameworthy, if they can be avoided; false conclusions and erroneous assumptions are demonstrated by no well considered objective examination, and they are chiefly based on haste.

[illegible] but not in all cases. One does not readily recognize a living [illegible] right look between the columns, as a three hall, and likewise see in the small stone seat (Fig. 8) a throne, or desire to drive out the adjacent regularly arranged stone benches as [illegible] the walls, that consist of irregularly arranged small stones and slightly recessed panels, as the precursor of the [illegible] friezes of the Greeks wooden or stone temples! The

of Tiryns and Mycenae. Another great apartment, turned more to the north, is designated as an "oil press room"-- the manufactory in the midst of the king's apartments --, from which a channel or a groove leads to a lower lying room, in which were placed the great and finely wrought vases (pithoi; Fig. 34). The Palace with its courts, passages and rooms of the most diverse kinds and purposes covered a vast area, that strongly invites to study. In the complex of walls, living and social rooms, Evans desires to recognize the so-called Labyrinth, that Minos had constructed by Dedalus as a dwelling for the M Minotaur. Taken all in all, England has made a gift of the first rank to the archaeological and scientific circles of Europe by the excavation of the Palace, by which men remain indebted in deep gratitude. That received on the whole, it must finally outshine the additions, that caprice and lack of technical knowledge have thrown into the bargain.

We learn by this more of the architectural powers and of the mode of living of the great in the second millenium B.C, than by many of the earlier discoveries.

That in the repairs and restorations, invention also had a word to say, is indeed intelligible. And that without repeated examinations from different sides, a final result could not be obtained, is also true. Great mistakes or reproductions in favor of preconceived opinions are blameworthy, if they can be avoided; false conclusions and erroneous assumptions are demonstrated by no well considered objective examination, and they are chiefly based on haste.

The designations of certain rooms may be accepted in general, but not in all cases. One does not readily recognize a living room 18.05 ft. in depth and 19.69 ft. wide, lighted only by s secondary light, and within which is built a bath 13.12 by 9.84 ft. = 129.17 sq. ft. of floor area, into which furthermore men might look between the columns, as a throne hall, and likewise see in the small stone seat (Fig. 33) a throne, or desire to give out the adjacent regularly arranged stone bench seats along the walls, that consist of regularly arranged small stone piers and slightly recessed panels, as the precursor of the t triglyph frieze of the Grecian wooden or stone temple! The

multiple loss was indeed occasioned by the fires in the excavations of the Amenofre in Corinth, where a tri-hyph-frieze was employed as a pediment in the design of the fountain(Fig.89).

Spiegel-Schmarsow, at least in their Handbuch der Kunstgeschichte (editions of 1905 and 1907) make a bath and a bath chair of the throne hall and throne seat, but there are some impossibilities in the so-called hall of the oracle are with the built platform, to which two wooden ladders must have ascended, not on the ground that they suggested in perspective according to Evans' geometrical drawings. Evans must have considered the Cretans as little people, because a passage from the ladders mentioned to the platform, with a clear height of 4.92 ft., he thought sufficient.(See Annual of British School at Athens, P. 111. 116: walls on east slope restored and hall of the double axes, cross section looking west, restored -- when the word "restored" is indeed superfluous).

To extend the record further would not be difficult -- but that must be here omitted. Let us as technical men pass to the technics.

"

For masonry we find employed the dense limestone and the syenite spar dressed in large sized blocks. Both materials were used beside and above each other on the same structure. The walls are in part coursed throughout in dressed blocks, but also in part are with two faces, i.e. are constructed with stone walls between upright slab-like sailers. The faces of the l

tooth chisel, with strokes from right to left. Stonecutters' marks are everywhere seen on the external surfaces (Fig. 88). The heights of the sailers vary from 0.66, 0.88, 1.02, 1.64, and 1.80 to 8.37 ft., their lengths from 2.66, to 10.8, and 13.12 ft., with coupling of 2.66 ft. in depth.

It is characteristic for the walls, that they mostly rise from a slightly projecting plinth.(Fig. 86).

Connections of the facing sailers in the split stone walls up to 5.77 ft. turck by the insertion of pieces of wood cut in double dovetail shape may be assumed as certain, from the corresponding notches in the former. In the construction of the storehouses they are frequently preserved in the regular courses [illegible] (Fig. 8).

sublime idea was indeed originated by the finds in the excavations of the Americans in Corinth, where a triglyph-frieze was employed as a parapet in the design of the fountain(Fig.35).

Springer-Michaelis, at least in their Handbuch der Kunstgeschichte (editions of 1904 and 1907) makes a bath and a bath chair of the throne hall and throne seat, but there are some impossibilities in the so-called hall of the double ake with the built platform, to which two wooden hen ladders must have ascended, not on the ground that they appeared in perspective according to Evans' geometrical drawings. Evans must have considered the Cretans as little people, because a passage from the ladders mentioned to the platform, with a clear height of 4.92 ft., he thought sufficient.(See Annual of British School at Athens. P. 111, 113; halls on east slope restored and hall of the double axes, cross section looking west, restored -- when the word "restored" is indeed superfluous).

To extend the record further would not be difficult -- but that must be here omitted. Let us as technical men pass to the technics.

For masonry we find employed the dense limestone and the gypsum spar dressed in large slabsand blocks. Both materials were used beside and above each other on the same structure. The walls are in part coursed throughout in dressed blocks, but also in part are with two faces, i.e. are constructed with stone spalls between upright slab-like ashlars. The faces of the l latter are without edge drafts, only being dressed with the tooth chisel, with strokes from right to left. Stonecutters' marks are everywhere shown on the external surfaces (Fig. 36). The heights of the ashlars vary from 0.56, 0.65, 1.08, 1.61, and 1.80 to 3.37 ft., their lengths from 9.86, to 10.50 and 13.12 ft., with bonding of 2.46 ft. in depth.

It is characteristic for the walls, that they mostly rise from a slightly projecting plinth.(Fig. 36).

Connections of the facing ashlars in the split stone walls up to 5.77 ft. thick by the insertion of pieces of wood cut in double dovetail shape may be assumed as certain, from the corresponding notches in the former. In the construction of the storehouses they are frequently preserved in the regular course 3.28 ft. high. (Fig. 30).

Innorderto secure easily a beautiful jointing, the end surfaces are cut to less than a right angle in a technically inadvisable manner (Fig. 36). For split stone masonry, clay is determined to be the mortar. In the design of doorways, according to the dimensions and form of the door jambs and of the strike, specially cut ashlars were employed; first as framing, for the doorway, but also then to avoid extending the wooden framework and its covering to the ground, thus protecting it from the effect of dampness -- a method also still in use for new buildings in our time. Particular emphasis was placed on the condition of a durable and strong angle of the wall. These are mostly laid up in courses of hollowed out ashlars, that were joined together by dowells in the beds, so that the filling extended into the hollow up to 1.57 ft. The holes for the dowells still remain throughout (Fig. 36). The drains for water were carefully executed in the interior of the building and ended in special stones with openings, an example of the form of which is given in Fig. 36.

Building woods were formerly supplied by the famous cypress and cedar forests, that have now disappeared.

Concerning the use of bricks -- airdried and burned products -- as well as the mortar employed therewith (p. 37), certainly nothing is shown at Cnossos.

Of detached supports with architectural treatment,-- pillars or columns with definite forms of shaft, base and capital -- nothing has remained in Cnossos. The plain square piers of gypsum spath in the rooms of the storehouse with their stonecutters' marks on the external surfaces cannot be taken as such. Of shafts of columns, there lies in the vicinity of the little bath at the great tower, the drumoof verde antique 1.64 ft. in diameter with a round dowell hole at the centre. In the bath mentioned is preserved the location of a stone column; at the great stairway to the different stories appear somewhat doubtful round sinkings with square borders, that Evans assumes as the places for wooden columns and has utilized accordingly in his restoration of the stairway.(See photographic view of the stairway, Fig. 32). There also exist still three round and flat shaped stone bases 2.76 ins. high and 2.30 ft. diameter

in the entrance of the eastern building, and at right angles to the plinths of the Corinthian columns (fig. 22). [illegible] tian columns. I search in vain for the corresponding shafts, material for the column employed by Evans, and for justification of its treatment and use after the style of obsir or tabie ideas. The model in Heraklio relief of the Lions' Gate in Mycenae cannot be assigned for this, just as little as the supports represented on engraved plates and stones, larger at top, since the former is doubtful, and both are not representations of or from monumental architecture. They are far more to be referred to the domain of art industry, they represent Egyptian designs, as these were common on antique furniture from the earliest period. [1]

[illegible] At our dining table one evening, occasion to me in preference to the marble torch holder, 7.90 M. high, at Knossos, that is larger at top that at bottom, and which according to the existing domestic seems to have supported something; then it was said to him, that wooden supports with their thicker bottom s such wooden must have been so placed, because the sap would then run out better, whereby the wood would become more durable (Sic !). If one desires to guess to stone prescorpore, then should at least the late Minoan torch holder -- the bundle of twigs transformed into marble -- be left out of the game, point to the south, and not to the north, to recall the peri[illegible] of the portion of the structure in Karnak built by Thotmes. [illegible] pl. 21), also represented in Perrot-Chipiez (figure, p. 555. [illegible] and it is just perceptibly enlarged upward, only so much as [illegible]

in the atrium of the eastern building, and at right angles to these stand three others (see ground plans and Fig. 36), that are similar to the low slabs under the shafts of ancient Egyptian columns. I sought in vain for the correspondong shafts, as well as for the proof, that just wood must be the correct material for the columns employed by Evans, and for justification of its treatment and use after the style of chair or table legs. The model in heraldic relief of the Lions' Gate in Mycenae cannot be assigned for this, just as little as the supports represented on engraved plates and stones, larger at top, since the former is doubtful, and both are not representations of or from monumental architecture. They are far more to be referred to the domain of art industry, they represent Hermes figures, as these were common on antique furniture from the earliest period. [1]

*1. The young English architect of Mr. Evans, who accidentally sat at our dining table one evening, appealed to me in reference to the marble torch holder, 7.90 ft. high, at Eleusis, that is larger at top that at bottom, and which according to the existing dowells seems to have supported something; then it was said to him, that wooden supports with their thicker bottom e ends upward must have been so placed, because theysap would thus run out better, whereby the wood would become more durable.(Sic !). If one desires to appeal to stone precursors, then should at least the late Eleusinian torch holder -- the bundle of twigs transformed into marple -- be left out of the game, going to the south, and not to the north, to recall the perverse columns (Puchstein calls them sceptre or thyrsos columns) of the portion of the structure in Karnak built by Thothmes. On the shaft of the column, slightly enlarged upward, stands an inverted bell capital, with leaves growing downward. The shaft must there be somewhat enlarged upward to be able to receive the margin of the bell, and it naturally has there its greatest diameter. The stone column reproduced in Lepsius (I, pl. 81), also represented in Perrot-Chipiez (Egypte, p. 558, 572), is stumpy, 19.69 ft. high with a diameter of 3.94 ft., and it is just perceptibly enlarged upward, only so much as the eccentric capital required. It is a work of the 18 th Dy-*

for the Inverted: the Greeks was not so, if according to Doesn monumental architecture. (See what is said concerning the Gate of Lions).

But proof is required, when the several mentioned technical men of other nations state, for example concerning Gnossos:- "Very important is finally the finding of a column of cypress wood, preserved for almost its entire height, whereby the characteristic diminution of the wooden support columns, also transferred to the stone columns of the time, can at last be proved by an original example."

Charred pieces of wood (see my essay and illustrations in the Jahresheften of the K. K. Oest. arch. Inst. Vol. 10. Vienna. 1907), as well as charred remains placed in a bronze sarcophagus were brought from the locality of the find to Candia, where they are preserved and publicly exhibited. Whether these were remains of ceiling beams or of posts, history is silent. In which room of the palace and in what position they had fallen and were found, is absolutely immaterial, since the specimens are indeed nothing more than shapeless remains of wood, without any vestige of architectural subdivision and

Also in itself, a conical piece of wood does not long last,

restoration of his stairway and light court, with the additions

sions, since they are based on false assumptions.

*dynasty (1597-14447 B.C.), in which the inverted capital had the inverted shaft as a necessary result.*

*The Egyptian artist remained logical in this -- the reversed for the inverted; the Cretan was not so, if according to Evans he proceeded according to art industrial precursors in his monumental architecture. (See what is said concerning the Gate of Lions).*

But proof is required, when the savant mentioned technical men of ohher nations state, for example concerning Cnossos:- "Very important is finally the finding of a column of cypress wood, preserved for almost its entire height, whereby the characteristic diminution of the wooden support downward, also tr transferred to the stone columns of the time, can at last be proved by an original example."

Charred pieces of wood (see my essay and illustrations in the Jarhesheften of the K. K. Oest. Arch. Inst. Vol. 10. Vienna. 1907), as well as charcoal remains placed in a gypsum sarcophagus were brought from the locality of the find to Candia, where they are preserved and publicly exhibited. Whether these were remains of ceiling beams or of posts, history is silent. In which room of the palace and in what position they h had fallen and were found, is absolutely immaterial, since the specimens are indeed nothing more than shapeless remains of wood, without any vestige of architectural subdivision and also without any mark of a technical treatment in the material.

Also in itself, a conical piece of wood does not long tell, whether it stood with the thick or thin end on the ground, where all members preparatory to a base or capital are lacking.

To the shafts of columns restored from these scanty and entirely irrelevant remains of wood were now erroneously added broad- headed forms of capitals -- forms that contradict the nature of wood -- which Evans had executed in relief in the restoration of his stairway and light court, with the addition of heraldic colorings, that mock all statical and esthetic feeling. Likewise the conclusions derived from mural paintings for the forms of columns under discussion are deceptive conclusions, since they are based on false assumptions.

Wooden columns enlarged upwards and with wooden capitals in

[illegible] as [illegible] [illegible] [illegible]

the style of the painted or stone forms, similar to those of the stele at the Lions' Gate or the half columns at the Tomb of Atreus at Mycenae, have never yet been proved in the palace structures on Crete, but are rather the products of a wild imagination or are caprices.

When it is further stated:- "Of the elevation of a Mycenean columnar facade with similarly formed supports, the remains of a mural painting further give a priceless representation," it must first be asked, where Mycenaean facades occur in general. The plans of the Palaces at Phaestos, Gournia and Cnossos exhibit none, and we just as little find such on Assyrian palaces or on Egyptian house architecture. Colonnades in antis or as ceiling supports in halls and corridors; yes -- but none are peripteral.

I have expressed on page 64 my opinions concerning the value of the mural painting referred to, adding a sketch with dimensions. But a few inches thereof are authentic, all the remainder being the free invention of Evans and his assistants.

I oppose this comparison without prejudice, and as a whole it does not come within our consideration. Only the "rudera" of the little columns, originally only 1.97 ins. high, attract us. [1]

*1. See the colored representation, not entirely corresponding to the original in the Museum at Candia, published by Fife. Jour. of Roy. Inst. of Brit. Architects. London. 1903.*

Only the drawing of the capital of the column standing in t the right space is preserved, with only the upper half of that in the left space. What form the shaft had is no longer to be stated. The shafts of the two little columns in the central space are without diminution, contrary to the colored English reproduction.

Merely the lower half of the left one remains, i.e., a black plinth and a portion of the shaft, with the similar plinth of the right one, the shaft and in part the capital being colored red. Their forms on the whole recall that of the stele in the tympanum of the Lions' Gate at Mycenae. From this pretty little painted column cannot be deduced at all a canon for its proportions on the basis of the upper diameter (since the lower

one is no longer determinable, and to desire to establish it as a model appears still more venturesome.

But for the form of the presumable column, a gaily painted border is appealed to, that as the upper termination (see the representation in the aforesaid Aufsatz der Oest. Jahreshefte) exhibits a series of small vertical supports 3.15 ins. high, which recall certain turners' work of a very much later time. In connection with the rosette border drawn beneath, w with which the series mentioned must harmonize, the whole may be designated as a pleasing work of art industry; to wish to [illegible] tible, so much the more that the border might also extend around the rectangular panel, just as in the painting with the capture of the bull, or on the panel with the so-called labyrinth in the Museum at Candia.

The mural painting mentioned, representing a religious festival or an assembly of people, therefore presents to us a real architectural gift in a form of column, that recalls Egyptian [illegible] " according to its magnitude and proportions -- diameter to height -- must be regarded as architectural and monumental."

It consists of the cylindrical and stumpy shaft, painted red, without base and crowned by a square abacus, without the intermediate echinus. Between the abacus and architrave is inserted a wooden cap. Above the architrave are indicated the well known round timbers, then the framework, on which are shown t the so-called sacred horns, behind which rises a structure of doubtful shape. The abacus capital shows a border painted blue and a middle part painted the same color, while the fillet around the latter is light in tone and beset with red disks. An enlargement of the shaft of the column upwards does not exist.

On this simple occurrence of a unique column, on a somewhat fanciful painting, should not be placed full value perhaps, if not contrary to all reflections, it were removed from doubt, and we have to do with an assured architectural form by the t finding of a steatite vessel in Agia Triada by the Italian Society.

one is no longer determinable, and to desire to establish it as a module appears still more venturesome.

But for the form of the premycenaean column, a gayly painted border is appealed to, that as the upper termination (see the representation in the aforesaid Aufsatz der Oest. Jahreshefte) exhibits a series of small vertical supports 3.15 ins. high, which recall certain turners' work of a very much later time. In connection with the rosette border drawn beneath, w with which the series mentioned must harmonize, the whole may be designated as a pleasing work of art industry; to wish to derive monumental architectural forms from it appears unjustifiable, so much the more that the border might also extend around the rectangular panel, just as in the painting with the capture of the bull, or on the panel with the so-called labyrinth in the Museum at Candia.

The mural painting mentioned, representing a religious festival or an assembly of people, therefore presents to us a real architectural gift in a form of column, that recalls Egyptian origin, but likewise occurs on Etruscan mural paintings, and according to its magnitude and proportions -- diameter to height -- must be regarded as architectural and monumental.

It consists of the cylindrical and stumpy shaft, painted red, without base and crowned by a square abacus, without the intermediate echinus. Between the abacus and architrave is inserted a wooden cap. Above the architrave are indicated the well known round timbers, then the framework, on which are shown t the so-called sacred horns, behing which rises a structure of doubtful shape. The abacus capital shows a border painted blue and a middle part painted the same color, while the fillet around the latter is light in tone and beset with red disks. An enlargement of the shaft of the column upwards does not exist.

On this simple occurrence of a unique column, on a somewhat fanciful painting, should not be placed full value perhaps, if not contrary to all reflections, it were removed from doubt, and we have to do with an assured architectural form by the f finding of a steatite vessel in Agia Triada by the Italian Society.

In similarly perfected manner as an another famous vessel in steatite from the same locality, described by F. von Duhn in such an energetic way [1] and represented in the reports of the Italian finds, there are represented on the recently found vase of funnel shape figure compositions and architecture, among w which are columns, that repeat in low relief the form drawn in the paintings.

*1. See Deutsche Rundschau. Heft 12. P. 348 et seq. Italienische Entdeckerarbeit auf Kreta. Berlin. 1903.*

The vase with its fine low sculptures is left in the natural blackish-gray color of the material, no application of color enhances the decoration, and the form alone speaks. Of funnel shape with an added handle, it measures 18.31 ins. high with an upper diameter of 7.09 ins. It is divided into four zones, which are separated by triple rounds. On the first, third and fourth zones are represented combats of men, on the second being bull tamers. On the first and third zones , three columns on each support the dividing bands, but these are lacking on the second and fourth. The shafts of the columns are diminished upwards, are without bases, and they support a square abacus capital without the intermediate echinus, just as on the painted column. In harmony with this, the surface of the abacus is sunken at the middle, and the outer border is beset by circular disks. A cap placed above extends the bearing of the horizontal dividing beam (Fig. 37), in which the columns are represented from my own sketch).

The form of the capital reappears in the mural paintings of the Etruscan "Tomb of the Bulls" at Corneto-Tarquinia; red shaft and red capital with black border. [2]

*2. See Antike Denkmäler II. Pl. 41. Berlin. 1901.*

Among the finds in the Museum at Candia is yet to be mentioned a curved stucco fragment, that must be regarded as a portion of the shaft of a column of small diameter. The surface shows on a light blue ground the zigzag ornament and spiral lines in white.

A frieze ornamentation, sometimes executed on mural paintings, sometimes in relief on red porphyry or greenish alabaster, consisting of vertical parts with adjacent palm-leaf ornamentation on the right and left of these, which has given opportunity f

cuted in alabaster with blue glass inlays; another example (see plate 2 already mentioned), is preserved in the British in red porphyry and found in Mycenae, are to be found in the green stone (alabaster) is in the Museum at Candia. They vary in height from 21.9cm, 11.21 to 9.84 ins, being only 7.48 ins. in Cnossos. Most exists in relief objects appears to have be- ed by from their architectural surroundings, and only the stability in Cnossos gives the location of the cresment beneath the position of the column, the so-called gold triptych (Fig. 74), but as a part of the frieze under the main cornice. The- would not be authenticated. The same ornamental form is also found on the yellow clay vessels with brown drawings of the " third and last epoch of the Minoan period.[1]

1908, I am informed with reference to my final conclusions (p. 37, Note 36), that the use of a "moon" later style illustrat- ed my me in Ost. Jahreshefte X, 1907, only belongs to the e end of the "palace style." For my final conclusion, this is on the whole immaterial. The fact is, that the acid uses of the time of my drawing stood in the museum at Candia in the case, whose contents were recorded in the second Minoan period. In the essay of Mr. Evans are only uses with yellow ground and green drawings were referred to the third epoch, that ended with the great catastrophe of the second palace at Cnossos, c- can prove by the facts, that the stone frieze under discussion was older than the similar drawings on the clay vessels.

Painted representation preceded the execution in relief on stone. As stated, it has been desired to explain in it the precursor of the triglyph frieze of the Greek Doric temple and of other public buildings of that style. The explanation

for varied explanations, is also to be mentioned in Cnossos.

It was first made known in the description of the acropolis of Tiryns (see colored plate 2), there designated as being executed in alabaster with blue glass inlays; another example from the Tomb of Atreus in Mycenae and carved in red porphyry (see plate 2 already mentioned), is preserved in the British Museum in London, two other pieces of unequal sizes, likewise in red porphyry and found in Mycenae, are to be found in the National Museum at Athens, and a last one known to me in bluish green stone (alabaster) is in the Museum at Candia. They vary in height from 21.65, 11.81 to 9.84 ins, being only 7.48 ins. in Cnossos. What exists in relief objects appears to have been tory from their architectural surroundings, and only the painting in Cnossos givvm the location of the ornament beneath the position of the column, the so-called gold triptych (Fig. 28), but as a part of the frieze under the main cornice. Thereby the "ever recurring" rosette band as the base of the wall would not be authenticated. The same ornamental form is also found on the yellow clay vessels with brown drawings of the third and last epoch of the Minoan period. [1]

*1. In the work "Ovalhaus und Palast in Kreta" by F. Noack, 1908, I am informed with reference to my final conclusions (p. 37, Note 35), that the vase of a "much" later style illustrated my me in Oest. Jahresheften X, 1907, only belongs to the e end of the "palace style." For my final conclusion, this is on the whole immaterial. The fact is, that the said vase at the time of my drawing stood in the Museum at Candia in the case, whose contents were recorded in the second Minoan period. In the essay of Mr. Evans are only vases with yellow ground and brown drawings were referred to the third epoch, that ended with the great catastrophe of the second palace at Cnossos, a-about 1500 B.C. An error was only made by me, if Mr. Noack c can prove by the facts, that the stone frieze under discussion was older than the similar drawings on the clay vessels.*

Painted representation preceded the execution in relief on stone. As stated, it has been desired to explain in it the p precursor of the triglyph frieze of the Grecian Doric temple and of other public buildings of that style. The explanation

and derivation, according to Vitruvius and now generally accepted for the Doric triglyph frieze would forbid this. Its arrangement as the plinth of a wall would be foolish.

In the excavations of the Americans in Corinth, [2] as stated, there was found above a plinth 0.28 to 1.12 ft. high a gayly painted stone triglyph frieze 3.28 ft. high with a cornice projecting 0.46 ft.(without mutules), as a parapet wall at the F fountain house and with consecrated gifts placed thereon, which informs us, that already Grecian masters did not very strongly accept the theoretical derivation of the frieze from wooden c construction, when the triglyph frieze had become petrified into a typical ornamental element.

*2. See Fig. 35 and American Journal of Archeaology. Vol. 6. 1902.*

In the Doric frieze triglyphs and metopes are separate, apparently in themselves actual members of the construction with a close spacing of the triglyphs. For an ornamentation of the frieze by figure or ornamental decoration, the metopes remain separate from the triglyphs. It is otherwise on the premycenaean and Mycenaean friezes, on which the palm leaves developing at the sides over part of the space belong to probable triglyphs. Two such palm leaves touch each other at the middle of the so-called metope panel, requiring an elongated form of this with a wide spacing of the dividing marks. This is the very strongly prominent characteristic difference between the two. Men would indeed neither wish to recognize harmonizing ornamental forms with vertical separations and two sid palm leaves from Tiryns, Mycenae and Cnossos on bench seats, on wall plinths, nor beneath the main cornice, or on detached blocks as portions of the original form of a Doric triglyph frieze.

The plane ceilings of halls and of rooms in the Palace were certainly constructed of wood and covered by stucco, that was in part decorated by painted patterns in relief. These recall in their drawing that part of the ceiling in the domed Tomb at Orchomenos executed in stone (Fig. 38) or Egyptian precursors. The scrolls are wrought with moderate skill, the intermediate lozenges bear yellow rosettes with red receptacles and ribs on a light blue ground. The eyes of the volutes are likewise col-

and a reproduction of the same is in the British Museum in London, from which the adjacent Fig. 88 was drawn. But ceilings in which the woodwork remained visible may also be assumed, a over if vestiges of such cannot be established. The wall surfaces in subordinate rooms, for example in the storerooms, were coated with sprem mortar 0.79 to 0.98 in. thick and white washed. In them the lower part of the wall to a height of 8.88 ft. was painted white, then a plinth being indicated by a broad red band and a groove above it, the light color being continued above this without further subdivision. The walls in the bathrooms were frequently covered by slabs of gypsum about 6.56 ft. high, above which commence the plastering and the painting; coverings of painted terra cotta [1] are to be mentioned in addition to this mode of decoration. In other rooms are painted plinths on the walls, that imitate different kinds of marbles, just as awkwardly as the painted imitations of marbles in our mediaeval Romanesque churches. Again in others the wall surfaces are separated by borders, that likewise imitate marble in bold and bright colors.

1. A cataracom with the foot bath.

by inserted fresco pictures, which sometimes cover surfaces of 2.79 ft. high (for example, representing bull tamers); but more yet by the life size figure compositions, that are in part executed as painted stucco reliefs, and in part more plainly as flat paintings. Here belong the remains of the upper part of

size in the so-called procession corridor of the Palace; one

sate, the realistic bull', head, and many others. Notable in ornamental respects is the gay border on the garment of a queen (?), wine vase bore backwards, and portions of the frieze

colored blue. The original pieces are in the Museum at Candia, and a reproduction of the same is in the British Museum in London, from which the adjacent Fig. 38 was drawn. But ceilings in which the woodwork remained visible may also be assumed, e even if vestiges of such cannot be established. The wall surfaces in subordinate rooms, for example in the storerooms, were coated with gypsum mortar 0.79 to 0.98 in. thick and white washed. In them the lower part of the wall to a height of 3.28 ft. was painted white, then a plinth being indicated by a broad red band and a groove above it, the light color being continued above this without further subdivision. The walls in the bathrooms were frequently covered by slabs of gypsum spath 6.56 ft. high, above which commences the plastering and the painting; coverings of painted terra cotta [1] are to be mentioned in addition to this mode of decoration. In other rooms are painted plinths on the walls, that imitate different kinds of marbles, just as awkwardly as the painted imitations of marbles in our mediaeval Romanesque churches. Again in others the wall surfaces are separated by borders, that likewise imitate marble inlays (mosaics in hard stones), or treated as rosettes and bands in bold and bright colors.

*1. A bathroom with the foot bath.*

But a maximum in richness is attained in the mural decoration by inserted fresco pictures, which sometimes cover surfaces of 2.79 ft. high (for example, representing bull tamers); but more yet by the life size figure compositions, that are in part executed as painted stucco reliefs, and in part more plainly as flat paintings. Here belong the remains of the upper part of the body of a youthful figure with a neck band of lilies [1] and the arms of a man holding a pointed vase, executed in hard gypsum, then the procession of people bearing vessels in full life size in the so-called procession corridor of the Palace; one figure in low relief and painted, which is in stucco relief ( (restored) like an Indian chief gleaming with warlike ornaments, the realistic bull's head, and many others. Notable in ornamental respects is the gay border on the garment of a queen (?), wine vase borne backwards, and portions of the frieze with naturalistic flowers, white lilies with stamens and green

leaves in excellent drawing, rising from a red ground. As por-
[illegible] ment of a rosette band of gray alabaster, that is masterfully
cut from stone with great certainty. The form of the rose lea-
ves recalls those of the palm-like composed probably tripylon.
[illegible] 1900-1901. Pl. 6. p. 17. 88.

[illegible] ted of smoothly wrought large slabs of gypsum south of light,
though bluish color. In the long corridor before the store-
[illegible] assumed that they are still the ancient ones.

[illegible] furniture of the dwelling, that are preserved in the Museum at
Gaudia. The most remarkable among these, and a pearl of anti-
que art industry, is the so-called game board, more correctly
indeed being the cover of a coffer. [illegible] ft. long and 1.27 ft.
wide, that is artistically composed of ivory with inlaid rock
crystals, between narrow gold bands, stripes and flower ranch
(marguerites) of blue enamel and rosettes of crystal plates
on silver foil.[1] The drawing is just as beautiful as unique
with a splendid distribution of the colors. How much of this
is to be attributed to restoration may remain doubtful at first.
Precious likenesses are the little painted-up mortice ladies
(Fig. 44), as well as the little seeing made figures carved
[illegible] work of minor sculpture of good rank. Such a little dame in
similar toilette and with luxuriant hair, apparently found in
the Troad and executed in bronze, is to be found in the Berlin
[illegible] (Fig. 45).

[illegible] cation with that made known on the wall surfaces of the Palace
of Tell-el-Amarna in Egypt? Has it not likewise a similarity
to the finds in the Palace at Tiryns, where enamels appear in
an alabaster frieze (see colored plate 2 at page 40), as least
in a technical respect?

[illegible] ly mentioned -- or throne seat with high back and hollowed s-

leaves in excellent drawing, rising from a red ground. As portions of a mural decoration might I further designate the fragments of a rosette band of gray alabaster, that is masterfully cut from stone with great certainty. The form of the rose leaves recalls those of the palm-like composed probably triglyphs.

*1. See Annual of British School at Athens. No. 7. Session 1900-1901. Pl. 6. P. 17, 89.*

The floors in the corridors and rooms are entirely constructed of smoothly wrought large slabs of gypsum spath of light, though bluish color. In the long corridor before the storerooms they have a square form with 2.76 ft. sides, it being assumed that they are still the ancient ones.

Of high artistic value are the pieces found belonging to the furniture of the dwelling, that are preserved in the Museum at Candia. The most remarkable among these, and a pearl of antique art industry, is the so-called game board, more correctly indeed being the cover of a coffer. 3.38 ft. long and 1.97 ft. wide, that is artistically composed of ivory with inlaid rock crystals, between narrow gold bands, stripes and flower bands (marguerites) of blue enamel and rosettes of crystal plates on silver foil. [1] The drawing is just as beautiful as unique with a splendid distribution of the colors. How much of this is to be attributed to restoration may remain doubtful at first. Precious likewise are the little patched-up majolica ladies (Fig. 41), as well as the little soaring nude figures carved from ivory with gilded hair wrought from lead. Entirely the work of minor sculpturs of good rank. Such a little dame in similar toilette and with luxuriant hair, apparently found in the Troad and executed in bronze, is to be found in the Berlin Museum. (Fig. 41).

*1. Must not this kind of surface decoration have some connection with that made known on the wall surfaces of the Palace at Tell-el-Amarna in Egypt? Has it not likewise a similarity to the finds in the Palace at Tiryns, where enamels appear in an alabaster frieze (see colored plate 2 at page 40), at least in a technical respect?*

There is further to be recalled the stone bath chair previously mentioned -- or throne seat with high back and hollowed seat;

(Pls. 86); a copy of the same in the British Museum in London) as the the crate unique and partly like the Egyptian in shape, stone lamps, stone vases and clay vessels,(See Jarmsenere i. Oest. Arch. Inst. Vol. 10, P. 83. 1907).

Of equal importance with the treatment of the living and social rooms is also that of the storerooms, which were accessible from a corridor 46.80 ft. long and 6.38 ft. wide and could be closed by doors. Every corner is utilized in these rooms. Around against the walls stand the great vases (pithoi) for containing oil or other liquids, as still common today in the same storerooms of Cardia. Nothing has changed here, neither the form of the clay vessels nor the mode of keeping the products. The free space between the vases is sunken and is divided into rectangular cavities 8.22 ft. long and 1.48 ft. wide, which are lined with slabs of gypsum spar 1.97 to 2.76 ins. thick. The slabs were either joined or abutted against each other, the cavity itself being again covered by slabs and disused for keeping fruits. Likewise must here again be reference be made to the splendid clay vessels 8.86 ft. high in the event [illegible]

ropes for transportation to the kiln.

The greatest diameter of these spheroid vessels amounts to [illegible]

and the hard burnee clay is mixed with small pebbles.

The new stairway in two flights between the stories is 3.17 ft. wide with risers 5.12 ins. high and treads 16.80 ins. wide. is open toward the little court 11.48 ft. wide and 18.08 ft. long (see colored plate 3); instead of external dining walls, supports of the flight by wooden columns are assumed by Evans, to which circular sinkings in certain uncovered slabs may indeed have led him.

The construction is rather antique nor very thoughtfully worked out. Who has ever set masonry stair steps on wooden columns and laid stone steps on sloping beams, sheathing these underneath with boards, or placed detached wooden posts in stone sockets? The building police, sound human reason and understanding of technics have forbidden it here.

According to the great mural paintings, cable roofs were ex-

(Fig. 33); a copy of the same in the British Museum in London) as the the quite unique and partly like the Egyptian in shape, stone lamps, stone vases and clay vessels,(See Jahreshefte d. Oest. Arch. Inst. Vol. 10. P. 63. 1907).

Of equal importance with the treatment of the living and social rooms is also that of the storerooms, which were accessible from a corridor 45.60 ft. long and 6.33 ft. wide and could be closed by doors. Every corner is utilized in these rooms. Around against the walls stand the great vases (pithoi) for containing oil or other liquids, as still common today in the sale storerooms of Candia. Nothing has changed here, neither the form of the clay vessels nor the mode of keeping the products. The free space between the vases is sunken and is divided into rectangular cavities 3.22 ft. long and 1.48 ft. wide, which are lined with slabs of gypsum spar 1.97 to 2.76 ins. thick. The slabs were either gained or abutted against each other, the cavity itself being again covered by slabs and designed for keeping fruits. Likewise must here again be reference be made to the splendid clay vessels 6.56 ft. high in the eastern building with their four rows designed for passing through ropes for transportation to the kiln.

The greatest diameter of these splendid vessels amounts to 4.59 ft., the thickness of their walls is 0.79 to 0.98 inch, and the hard burned clay is mixed with small pebbles.

The new stairway in two flights between the stories is 6.17 ft. wide with risers 5.12 ins. high and treads 18.90 ins. wide, is open toward the little court 11.48 ft. wide and 18.05 ft. long (see colored plate 3); instead of external string walls, supports of the flight by wooden columns are assumed by Evans, to which circular sinkings in certain uncovered slabs may indeed have led him.

The construction is neither antique nor very thoughtfully worked out. Who has ever set masonry stair steps on wooden c columns and laid stone streads on sloping beams, sheathing these underneath with boards, or placed detached wooden posts in stone sockets? The building police, sound human reason and understanding of technics have forbidden it here.

According to the great mural paintings, gable roofs were ex-

excluded in the form of the roof and only the clay terrace roroofs on round logs were permissible as in Asia Minor.

The materials for a restoration of the Palace are apparently rich; we know the ground plan, the construction of the walls, the location of the stairways, the indications of the supports, the method of decorating the interiors -- but still the elevavation of the external architecture will first remain a book with seven seals.

Information concerning the external appearance of the houses near Cnossos is given by a great number of small porcelain tiles, some of which are shown slightly enlarged in Fig. 42. They are stone structures in one or more stories with flat roofs and part have a raised structure at the centre. Much for the imagination, little for plain reality.

Of a somewhat smaller palace design on Crete, a comprehensive essay by Luigi Pernier affords conclusions. [1] We here likewise find the different rooms grouped around a central court, that is 72.18 ft. wide and 154.20 ft. long. On the east lie the women's apartments with a megaron formerly adorned by columns and an adjacent portico, a bath etc.; on the west are the megaron of the men, the throne hall, the bath and the storerooms, separated by a long corridor. Massive flights of steps and small connecting stairs lead up to the living and assembly rooms.(See ground plan; Fig. 43). Charred timbers were also found in this building. L. Pernier says, that this building material found extensive employment, indeed as shafts of columns (?), pilasters, girders, beams and rafters. Further in the form of boards for covvving doors and walls as well as for floors.

*1. See Novvmber, 1903, Heft of Revista d'Italia under the title of Il Palazzo, la Villa e la Necropoli di Festa.(Scavi della Missione archeologica Italiana a Creta. 1900-1903. P. 763-789.*

Three kinds of stone bases were determined; those in form of great disks or frustums of cones, others made of lower round stone slabs, and still others as square plinths with their roond disks to receive the column, made of limestone, marmo venato, conglomerate stone or gypsum spar.

The internal decoration in great part consisted of painted stucco. The pattern was the simplest conceivable. The ceiling preserved in place exhibit a red tone with the small rectangular panels. [illegible] plinths, yet others are likewise white, enclosed by broad red horizontal bands of incisions, or crepis yellow enclosures with red zigzag lines. Some floors were also of red or white stucco surrounded by red borders and decorated by palm-leaves or spiral lines.

[illegible] Phaestos, that occupied an area 480 ft. long and 49.21 ft. wide.[1] Similarly constructed and decorated. Just as few columns of any material were there found, as at the palaces now treated, in which only bases could be determined.

1. Rosti dell' ate minoeno scoperti ad Knossos Phaisto Phaesto [illegible] 1904.

The further discoveries after 1902 of the ruins of Pyla Tripha are given in the ground plan of Mosch (Cavallaro and Fabest in Creta, 1906, p. 30) and are properly interpreted, so far as [illegible] the Aegean Civilization. Ann. Brit. School at Athens. [illegible] 1902-1903). Then W. Dörpfeld, according to whom "the designers of the ancient Cretan Palace carried the old plan of their houses with them into the conquered country, and the caused to be built their Palace by the native workmen, with some peculiarities [illegible] tion later changed by him. "That the Later Palace built for the older one, and that only a certain relationship with the [illegible] was built at the same time as the Later Cretan palace (P. 88).

Palace in Tiryns was built, nor which stands that of Mycenae. "The Cretan palaces of Arkalis are too late, therefore the later Cretan Palace must have influenced these or the main land; for the various art forms, as well as the mural decoration in Tiryns, Mycenae and even Orchomenos exhibit the style of the

The internal decoration in great part consisted of painted stucco. The painting was the simplest conceivable. The panels preserved in place exhibit a red tone with the simplest geometrical ornaments. Others are entirely white with dark plinths, yet others are likewise white, enclosed by broad red horizontal bands of incisions, or orange yellow enclosures with red zigzag lines. Some floors were also of red or white stucco surrounded by red borders and decorated by palm-leaves or spiral lines.

Federigo Halbherr discovered in 1902 a "Villa Micenea" near Phaestos, that occupied an area 328 ft. long and 49.21 ft. wide.[1] Similarly constructed and decorated, just as few columns of any material were there found, as at the palaces now treated, in which only bases could be determined.

*1. Resti dell' eta micenea scoperti ad Haghia Triada presso Phaestos. Rapporto 1902. Rome. 1903.*

The further discoveries after 1902 of the ruins of Agia Triada are givvy in the ground plan of Noack (Ovvlhaus und Palast in Kreta, 1908, p. 30) and are properly interpreted, so far as possible.(Also see on this, D. Mackenzie, Cretan Palaces and the Aegean Civilization. Ann. Brit. School at Athens. No. 12. 1905-1906). Then W. Dörpfeld, according to whom "the destroyers of the ancient Cretan Palace carried the old plan of their houses with them into the conquered country, and the caused to be built their Palace by the native workmen, with some peculiarities borrowed from the ancient Cretan palace." -- A perception later changed by him. "That the later Palace built for the Achaians by the native architects differed but little from the older one, and that only a certain relationship with the Achaian palaces of Argolis can be recognized." Noack is of the contrary opinion; that the older of the two palaces in Tiryns was built at the same time as the later Cretan palace (P. 35). And these must have long existed, when the remaining later Palace in Tiryns was built, near which stands that of Mycene. "The Achaian palaces of Argolis are too late, therefore the later Cretan Palace must have influenced those of the main land; for the various art forms, as well as the mural decoration in Tiryns, Mycenae and even Orchomenos exhibit the style of the

dress and, if the later palace on Crete," a conclusion that may also apply to the older Palace in Tiryns. Once thereby remains the oldest part; the seats of the chiefs of the main land are not given in a certain order -- a hypothesis, that most m months called and with much one can agree.

On Crete, in accordance with the well known oval area for sacrifice in form of horns,-- was found the Oval House, or the sitting form of house in the ruins of the House of Ornamental - Sistora. Discovered by S. Xanthudides, to wim we owe the first . 55, 56, then Hall, Orchomenos 180, with the adjacent Altar-

Conceived as a "single room," such an oval house is nothing more than the circular house; as an interior with several cells, the interior appears somewhat crowded, even comical. One asks reasonably why with already particular walls are the outer walls curved, which only cause difficulties in the treatment of the roof? We recall megaroid room towers changed into living r. . . . . certainly.(Fig. 4a). Likewise for the Cretan "covered buildings", the exterior walls and the roof must be older than the partition the interior rooms does not appear very original.

. . . . . are a clear separation between the curved structure -- as the primitive European form of house -- and the rectangular house, that was a creation of the east. Others wish the rectangular architectural form in the South to prove merely for an influence from the North. Thus Buile (See Above, p. 50) asserts, that the "megaron house" could only be invented by a northern people, who required warmth and placed the hearth at the centre of the house. Pagorin (L'Origine del Domus. Rome. 1902) says on the contrary, that a "house adapted to the South" could not have been brought from the interior of Europe, but only over the Mediterranean from the East to the North. The South requires . . . . . the possibility of a cool and airy living in rooms open above, and that of enjoyment within solid walls without windows, and

great art of the later Palace on Crete," a conclusion that may also apply to the older Palace in Tiryns. Crete thereby remains the giving part; the seats of the giants of the main land are receiving in a certain sense -- a hypothesis, that most m merits belief and with which one can agree.

On Crete, in accordance with the well known oval urns for ashes in form of houses,-- was found the Oval House, or the elliptical form of house in the ruins of the House of Chamaizi - Sitera. Discovered by S. Xanthydides, to whom we owe the first careful publication concerning it.(Ephem. Arch. 1906, and Noack, p. 53, 57, then Bulle, Orchomena 126, with the adjacent illustration from Noack; Fig.44).

Conceived as a "single room," such an owal house is nothing more than the circular house; as an interior with several cells, the interior appears somewhat cramped, even comical. One asks properly; why with straight partition walls are the outer walls curved, which only cause difficulties in the treatment of the roof? We recall mediaeval round towers changed into living r rooms in the Renaissance period, where men make a virtue of necessity.(Fig. 44). Likewise for the Cretan "covered buildings", the external walls and the roof must be older than the partition walls of the interior. The skylight in the roof for lighting the internal rooms does not appear very original.

Prehistoric investigators (Montelius and Sophus Müller) desire a clean separation between the curved structure -- as the primitive European form of house -- and the rectangular house, that was a creation of the East. Others wish the rectangular architectural form in the South to pass merely for an influence from the North. Thus Bulle (See Noack, p. 54) asserts, that the "megaron house" could only be invented by a northern people, who required warmth and placed the hearth at the centre of the house. Padroni (L'Origine del Domus. Rome. 1902) says on the contrary, that a "house adapted to the South" could not have been brought from the interior of Europe, but only over the Mediterranean from the East to the North. The South requires from the house protection for the occupants from the sun's rays, the possibility of a cool and airy living in rooms open above, and that of enjoyment within solid walls without windows, and

rch into the north, the back interior [illegible]
light at the sides through windows, through which in good and bad weather were received light and air. (See Dorm. Sarkuhed der Ethuseker und Fomer. 2nd edition. P. 4553). The measure w with high side light or with open attic over the four columns is therefore only possible in the South, in a climate free from rain, snow and ice.

[illegible]
ces with reference to architectural axes. He will not find such, in the sense as understood in building plans. At it appears, he configurds building lines with building axes, according to the parallel lines drawn by him on the plans of Aqia Triade.

Architecturally of the highest interest is at the plane mentioned the brightly colored drawing of a great entrance doorway, represented on a sarcophagus with cornerstones, jambs and lintel (Fig. 46) above a pitch adorned by rosettes.

[illegible]
a fourth palace, concerning which Miss F. A. Boyd gives according by Fig. 46.[1] -- It has in plan much allied to the greater hall-[illegible] it is radically different from them in construction. Instead the stories built of bricks with lime mortar.(See page 87).

[illegible]
Vol. I. No. I. 1904.

The base of a columns also discovered. Of greater important [illegible] dition.(Fig. 60).

Of the buildings mentioned as of this period, only the so-called Lions' Gate in Mycenae has answered questions relating [illegible] column (stele) of vanished splendor! Works, that might give give evidence of the magnificence and comfort of the living, [illegible]

not like the north, the tepid interior enclosed on all sides, with permanent ceiling and closed roof with admission of the light at the sides trhough windows, through which in good and bad weather were received light and air. (See Durm. Baukunst der Etrusker und Römer. 2nd edition. P. 482). The megaron w with high side light or with open attic over the four columns is therefore only possible in the South, in a climate free from rain, snow and ice.

Noack examines the ground plans of Mycenean and Cretan palaces with reference to architectural axes. He will not find such, in the sense as understood in building plans. At it appears, he confounds building lines with building axes, according to the parallel lines drawn by him and the plans of Agia Triada.

Architecturally of the highest interest is at the place mentioned the brightly colored drawing of a great entrance doorway, represented on a sarcophagus with ornamented jambs and lintel (Fig. 45) above a plinth adorned by rosettes.

Further excavations on Crete brought to light near Gournia a fourth palace, concerning which Miss H. A. Boyd gives conconclusions, and whose ground plan with subordinate buildings by Fig. 46.[1]-- Itshas in plan much allied to the greater buildings, as for example the great court and the storehouse, but it is radically different from them in construction. Instead of ashlar and split stone walls occur foundations and walls of the stories built of bricks with lime mortar.(See page 37).

*1. See Gournia. Report of American Exploration Society's Excavations at Gournia, Crete. 1901-1903. By Harriet A. Boyd. Vol. 1. No. 1. 1904.*

The base of a columnwas also discovered. Of greater importance is the finding of many bronze tools in well preserved condition.(Fig. 60).

Of the buildings mentioned as of this period, only the so-c called Lions' Gate in Mycenae has answered questions relating to architectural forms -- and there appears only a single half column (stele) of vanished splendor! Works, that might give give evidence of the magnificence and comfort of the living, have disappeared. Only those built for the dead now speak in

the royal tombs on Crete, in Argolis and near Panticapeon. T
[illegible] ar-
ports (colonnes), walls and ceilings, and they bear within them-
selves the germs of the later developments of these elements
of architecture on European soil.

[illegible]
respects, then we are compensated by some technical procedures.
On a square plan rise two vertical sphlar walls and two in the
form of a pointed arch. The latter rest against a common ridge
and at the same time form the wall and ceiling. A passage (dr-
omos) is flanked by sphlar walls and leads to the entrance,
that was covered by corbelled courses of stone. In its vicin-
ity are arranged two niches opposite each other, 2.90 ft. wide
and 3.77 ft. high, likewise covered by projecting courses. The
walls of the tomb chamber and of the passage stand against the
solid ground and are built with two faces. The external and
according to still existing indications.

[illegible]
ba ea at the Heraeo at Olympia. The bed and joints of the
white limestone blocks, set without mortar, are filled by thin
plates of bluish limestone (limestone slate). The stones of
varied length and height were covered by a thin coat of plas-
ter. [illegible]
20.90 ft. (Evans makes it 19.67 by 26.18 ft.[1]); the surfaces
of the vault correspond to the longer sides, that are constr-
ucted by corbelling (false vaulting). The five lowest courses
[illegible]
The fifth overhangs about 8.45 ins., by which the line of the
vault can be determined.

[illegible]
exceed definitely less than at a right angle (See A. Evans and
J. Durm), and thus are not horizontal. A covering slab was

the royal tombs on Crete, in Argolis and near Pantikapeon. T They show us the structural and form treatment of isolated supports (columns), walls and ceilings, and they bear within themselves the germs of the later devebopments of these elements of architecture on European soil.

If the tomb near Cnossos has nothing to givv in ornamental respects, then we are compensated by some technical procedures. On a square plan rise two vertical ashlar walls and two in the form of a pointed arch. The latter rest against a common ridge and at the same time form the wall and ceiling. A passage (dromos) is flanked by ashlar walls and leads to the entrance, that was covered by corbelled courses of stone. In its vicinity are arranged two niches opposite each other, 3.90 ft. wide and 3.77 ft. high, likewise covered by projecting courses. The walls of the tomb chamber and of the passage stand against the solid ground and are built with two faces. The external and internal ashlars were connected by wooden dovvvailed anchors, according to still existing indications.

The faces of certain stones bear the same stonecutters' marks as at the Palace at Cnossos.The bed and end joints of the white limestone blocks, set without mortar, are filled by thin plates of blackish limestone (limestone slate). The stones of varied lengths and heights were covered by a thin coat of plaster. The floor area of the tomb chamber measures 20.15 by 25.99 ft. (Evans makes it 19.87 by 25.13 ft.[1]); the surfaces of the vault correspond to the longer sides, that are constructed by corbelling (false vaulting). The five lowest courses thereof are still in place, the succeeding ones being wanting. The fifth overhangs about 9.45 ins., by which the line of the vault can be determined.

*1. See Archeologia or Miscellaneous Tracts relating to Antiquity. Second Series. Vol. 9. Prehistoric Tombs of Cnossos, by Arthur Evans. London. 1905; -- and Durm, J. Die Kuppelgrüber bei Pantikapeon in the Jahrb. d. K. K. Oest. Arch. Inst. Vol. 10. Vienna. 1907.*

It appears singularthat the beds of the vault stones are dressed definitely less than at a right angle (See A. Evans and J. Durm), and thus are not horizontal. A cowering slab was

terior, so that the ridge showed no continuous sharp angle.

A. Evans places his "Royal Tomb of Isopata" in the second Minoan period, thus in the time of the 16 th century B.C., thereby dating the Cnossos tombs earlier than the tombs in Mycenae and Tiryns.

common to both compartments of the vault and closed in the interior, so that the ridge showed no continuous sharp angle.

A. Evans places his "Royal Tomb of Isopata" in the second Minoan period, thus in the time of the 16 th century B.C., thereby dating the Cnossos tombs earlier than the tombs in Abydos and thebes.

The Lycian roof in form of a pointed arch over a rectangular plan is to be recognized in the vaulting. In the Lycian rock-cut tomb,-- a later imitation of archaic wooden construction -- is embodied the dwelling, in which according to the belief of the ancient peoples, the souls of the dead spent their existence. The interior can pretend to a certain internal effect, and it indeed reproduces the image of the ancient royal apartment, that formerly can scarcely have lacked an ornamental decoration.

That men had the intention to produce a considerably spacious effect in the interiors of the tombs may well be assumed, and that they desired to enhance this effect some centuries later in the Argolic royal tombs is just as certain. Already the more important dimensions and the return to the primitive (also Phrygian) circular form of the hut of brush or earth permits this conclusion. The round form allowed great spans without technical difficulties, the uncovered passage (dromos) and the massive portal (Fig. 48; view of the existing condition) permitted the lighting of the interior of the tomb by daylight, without the aid of artificial light.(Fig. 51; plan and section).

In erecting the vault , the centering may be omitted and the danger of its fall during or after completion of the work was decidedly less in comparison with the tunnel vault.

The acceptance of false instead of true vaulting was here justified from a technical standpoint and is no indication of decadence. Technically well planned is likewise the mode of relieving the great lintel of the doorway, which is constructed like that on the Lions' Gate, excepting that here the ornamented triangular slab, for closing the space left open over the lintel is now wanting.

The ascending courses are covered at the vertex by a larger hollowed horizontal stone slab without radial jointing; the

of a former metal covering of the finely joined and polished surfaces of the vault still exist in the form of bronze pins, as well as the remains of the treatment of the portal and of the architrave above it. They afford evidence of the form of the door, the enclosure of the doorway, the half columns and cornices and decorated slabs -- thus of the most important architectural elements.

[illegible]

[illegible] (photos) in Mycenae with illustrations was given by me in the Jahrb. d. K. K. Oest. Arch. Inst. in Vienna in 1897, of which it will only be emphasized here, that the joinings of the stones near the vertex have not been correctly represented heretofore, but that especially the statements concerning the half columns flanking the entrance must be considered [illegible] 80; the entrance facade).

[illegible]

[illegible] Athens. 1895.

On the basis of hasty observation and of bad plaster casts of the heraldic representation on the Lions' Gate and the existing remains of the capital, as well as the neglect of the still preserved bases of the columns, men have assumed shafts much larger spheres, since such occur under other circumstances in Kenak built by Thothmes.(1507-1447 B.C.). By the finding [illegible] ro, which is now placed in the British Museum in London, and from a fragment built into masonry in Naupli (now in the National Museum in Athens), the great [illegible] Mycenaean architects had before the Trojan war just as much correct artistic invention and technical intelligence as their precedecessors [illegible]. [illegible] various assumptions for the treatment of the portal with its [illegible] side one. On the other hand, Fig. 46 shows by sketches how the three moulding and their spiral ornaments on the shafts of

formerly existing holes near the vertex are again closed. Marks of a former metal covering of the finely joined and polished surfaces of the vault still exist in the form of bronze pins, as well as the remains of the treatment of the portal and of the structure above it. They afford evidence of the form of the door, the enclosure of the doorway, the half columns and cornices and decorated slabs -- thus of the most important architectural elements.

A thorough representation of this and of the nearest circular tomb (tholos) in Mycenae with illustrations was given by me in the Jahrb. d. K. K. Oest. Arch. Inst. in Vienna in 1907, of which it will only be emphasized here, that the jointings of the stones near the vertex have not been correctly represented heretofore, but that especially the statements concerning the half columns flanking the entrance must be considered as not sufficient in all previous publications. [1] (Figs. 47, 50; the entrance facade).

*1. Also see Thiersch, F. Die Tholos des Atreus zu Mycenai. Mitt. d. Kais. Deut. Arch. Inst. p. 177-182 and Pls. 11-13. Athens. 1879.*

On the basis of hasty observation and of bad plaster casts of the heraldic ornamentation on the Lions' Gate and the existing remains of the capital, as well as the neglect of the still preserved bases of the columns, men have assumed shafts much larger upwards, since such occur under other circumstances in antique architecture on but one building -- the hall in Karnak built by Thothmes. (1597-1447 B.C.). By the finding of the lost shaft of the column among the property of Lord Sligo, which is now placed in the British Museum in London, and from a fragment built into masonry in Nauplia (now in the National Museum in Athens), the proof is made, that the Mycenaean architects had before the Trojan war just as much correct artistic invention and technical intelligence as their predecessors on Crete. Fig. 47 gives the present condition and the various assumptions for the treatment of the portal with its half columns, among which is also the only correct and possible one. On the other hand, Fig. 49 shows by sketches how the zigzag mouldings and their spiral ornaments on the shafts of

pins or their marks in the sphinx, and may be seen from the remains of frieze found, now in the British Museum in London and in the National Museum in Athens. That the retaining triangle was formerly closed and not designed for the admission of light, must be assumed as assured by the precedent at the Lions' Gate and according to the adjacent tholos.

At the angles of the lintel of the doorway permit the inference of applied bronze ornaments on the facade. For these are now assumed Lions' heads and orts. The door leaves were frames made of gilded bronze (or more probably of wood covered by bronze or golden plates), and they completed the rich ornamentation of the entrance portal. Gilding on the shafts of the columns and the capitals I do not consider as excluded, with the other monumental polychromy of the architecture, executed in [illegible] marble.

But how all this was combined together in its own time and its general effect, the attempt at restoration by Perrot and [illegible] result free from objections.[1]

1. See Mallet and Thomas. [illegible] te. Vol. 6. Pls. 7, 79. The stereotomy form of the relieving triangle is restored, a filling or tiles in the heraldic style has erred; but Chipiez found it necessary to fill the two cavities with [illegible] in Gues. (Plate VI).

Not far from the Lions' Gate is to be found a second and quite [illegible] ter, according to Dörpfeld in Perrot and Chipiez. (Vol. 8, p. 622). The upper portion of the tomb (tholos) has fallen; the vestiges of a former metal covering of the interior do not

the columns actually appear.

That the rectangular surface of the wall over the doorway w was covered by decorated slabs may be recognized by the metal pins or their marks in the ashlars, and may be seen from the remains of friezes found, now in the British Museum in London and in the National Museum in Athens. That the relieving triangle was formerly closed and not designed for the admission of light, must be assuemed as assured by the precedent at the Lions' Gate and according to the adjacent Tholos.

Small holes arranged in horseshoe shape (Fig. 50) and others at the angles of the lintel of the doorway permit the inference of applied bronze ornaments on the facade. For these are now assumed lions' heads and owls. The door leaves were indeed made of gilded bronze (or more probably of wood covered by bronze or golden plates), and they completed the rich ornamentation of the entrance portal. Gilding on the shafts of the columns and the capitals I do not consider as excluded, with the other monumental polychromy of the architecture, executed in stones of various colors. Painted external architecture, also adorned by colored terra cotta, is proved on Egyptian-Assyrian works.

But how all this was combined together in its own time and its general effect, the attempt at restoration by Perrot and Chipiez on the basis of the genuine finds does not produce a result free from objections.[1]

*1. See Perrot and Chipiez. Histoire de l'Art dans l'Antiquite. Vol. 6. Pls. †, †9. The structural form of the relieving triangle is retained, a filling of this in the heraldic style has erred; but Chipiez found it necessary to fill the two adjacent slabs with walking lions, executed in the same style as in Susa.(Plate VI).*

Not far from the Lions' Gate is to be found a second and quite similarly constructed Tomb of about 45.28 ft. lower diameter, according to Dörpfeld in Perrot and Chipiez.(Vol. 6, p. 642). The upper portion of the tomb (tholos) has fallen; the blocks lying on the ground permit the cutting of the joints a and the dressingof the different ashlars to be accurately seen; vestiges of a former metal covering of the interior do not re-

remain.(See fig. 82; courtesy of the stones of the wall).

The entrance portal between the walls of the passage (dromos), access to which was once closed by masonry, exhibits a treatment similar to the Tomb of Atreus: the great doorway with the enclosure in recessed bands, the projecting cornice and the relieving triangle, only open externally. As novelties are added on the right and left and adjoining the walls of the passage smooth vertical projections, above them being strongly projecting plain abscesses, just as on the Tomb of Atreus, to correspond bases of half columns, likewise found in place, on which is wrought a fluted piece of the shaft 6.52 ins. high, so that in regard to the former existence of half columns flanking the portal, no doubt can exist. Thirteen shallow conic [illegible] found a fluted portion of a half column 4.28 ft. high, but [illegible] between the fillets to be recognized with uncertainty, yet which may yet be measured on one, though this may also be found by calculation. It was likewise attempted here to construct from this a column larger upward, that would give an upper diameter of 2.07 ft. for the column with a lower diameter of 1.88 ft. [1]

1. See my essay on this building with illustrations in K. K. [illegible]

[illegible] one only shows 2.38 ft. in width, and a capital with even the modest projection as at the Tomb of Atreus would then still [illegible] is assured here likewise the cylindrical shaft of the column, or one very slightly diminishes downward, and that the column thicker at top should be rejected.

[illegible] piece of which is still in place and exhibits the form of the entablatures of hewn rock-cut tombs. The disks of the projecting round logs are beside the abscess and the vertical projecting bands continue above them on the facade to the cornice of the wall.

remain.(See Fig. 52; coursing of the stones of the vault).

The entrance portal between the walls of the passage (dromos), access to which was once closed by masonry, exhibits a treatment similar to the Tomb of Atreus; the great doorway with the enclosure in recessed bands, the projecting cornice and the r relieving triangle, only open externally. As novelties are added on the right and left and adjoining the walls of the passage smooth vertical projections, above them being strongly projecting plain abacuses, just as on the Tomb of Atreus, to correspond bases of half columns, likewise found in place, on which is wrought a fluted piece of the shaft 5.51 ins. high, so that in regard to the former existence of half columns flanking the portal, no doubt can exist. Thirteen shallow Doric flutes in good condition may still be counted. There was also found a fluted portion of a half column 4.23 ft. high, but which is not so well preserved and only permits the distances between the fillets to be recognized with uncertainty, yet which may yet be measured on one, though this may also be found by calculation. It was likewise attempted here to construct from this a column larger upwards, that would give an upper diameter of 2.07 ft. for the column with a lower diameter of 1.28 ft. [1]

*1. See my essay on this building with illustrations in K. K. Oest. Jahrb. Vienna. 1907. "Vormykenische und mykenische Architekturformen."*

But the still preserved abacus of the width of the projections only shows 2.89 ft. in width, and a capital with even the modest projection as at the Tomb of Atreus would then still f find room beneath it, but not one corresponding to an assumed shaft of the column measuring 2.07 ft. at top. By this fact is assured here likewise the cylindrical shaft of the column, or one very slightly diminished downwards, and that the column thicker at top should be rejected.

New is further the form of the cornice abovv the doorway, a piece of which is still in place and exhibits the forms of the entablatures of Lycian rock-cut tombs. The disks of the projecting round logs are behind the abacus and the vertical projecting bands continue above them on the facade to the coping of the wall.

Instead of the facing with decorated colored stone slabs, there must have been plaster and painting, with which was also coated the shafts of the half columns made of porous limestone, while they were of greenish alabaster at the Tomb of Atreus. The question of the form of the facade in general must also be regarded as an open one for this monument.

Relating to the question of the shafts of the columns at the right and left of the doorways of the facades of both tombs, represented as disproportionately enlarged at top, I give the adjacent illustrations as a reply.(Fig. 53). There are now determined the places of bases of the shafts of the half columns, the arrangements for fixing these and marks on the masonry, the walls of the passage and the projecting slabs, beneath which were inserted the capitals of the columns, as well as the most valuable portion of a capital, that is also illustrated in Perrot and Chipiez from a photograph (Vol. 6. P. 8). The detail forms of these are determined with the execution of the transition member to the shaft. For this are assumed 2 or 3 annulets. Here is the only place where the imagination yet has play, all else being settled. If within the limits thus determined be drawn the corresponding shaft of the column, as attempted by me at a large scale, see what a noble result is produced! Certainly indeed it can not be obtained otherwise than as drawn, which according to either number of annulets only permits the cylindrical shaft or one very modestly enlarged upwards, as for the great stone columns of the 16 th Egyptian dynasty, by which the case now appears to be settled. The Eleusinian white marble torch holders mentioned (Fig. 54) were really steles, that once supported on their tops vases for offerings or consecrated gifts( according to the still remaining arrangements for fastening them, and they were not the supports of friezes or columns).

The Royal Tombs in Pantikapäon form a group of stone tombs, that have yet been little studied in a technical way, although some are in structural respects worthy of this in the highest degree. Built in courses of ashlars with thin lime beds, they are constructed over round and square ground plans and are covered by high domed roofs, whose vault lines are assured as be-

bined curved or straight (as the generatrix of the conical sur-
face). [illegible]
the stone courses, where the projections also appear internally
and are not dressed off to a uniform surface. As in Argolis,
[illegible]
mounds of earth, and are made accessible by passages covered
by stone slabs.

[illegible]
ulte of the tomb chambers, the external surfaces of the sub-
laire of the vertical walls as well as the fronts of the corbel-
led stones exhibit tied bosses, like the sallar masonry of It-
alian Renaissance palaces.

[illegible]
quite plan present structurally nothing new besides the stepp-
ed internal surfaces. Their vault line is a steep pointed
arch, the vault stones are backed with dry masonry, and the
vault itself is closed by a horizontal stone slab as in Myce-
nae, though with a reduced span.(21.88 instead of 48.21 ft.).
It is otherwise with those on rectangular or square ground
plans. Men would not here give up a high dome, and they were
not satisfied by making but two sides curve, leaving the oth-
er two vertical, as at the Royal Tomb at Dhoseos, no indeed --
[illegible]
height and then vaulted obliquely from these the four surfaces
of the ceiling, i.e., they placed a high square pyramid on the
corner as a ceiling. It changed into the curved form, they w
[illegible]
period first attempted. The visible stepping of the vault sur-
face was retained, a conical inserted slab formed the terminat-
ion, as sometimes shown on the indeed contemporary Etruscan
tombs.

[illegible]
royal burgen (royal tumulus); to erect a conical vault over a
[illegible]
the circumference of the circumscribed circle, the base of the
[illegible]
ical surfaces are produced four hyperbolic side arches, between
[illegible]

being curved or straight (as the generatrix of the conical surface). The vaults are "false", being formed by corbelling out the stone courses, where the projections also appear internally and are not dressed off to a uniform surface. As in Argolis, these are not detached structures, but they are buried beneath mounds of earth, and are made accessible by passages covered by stone slabs.

Their ceilings are constructed in the same manner as the vaults of the tomb chambers, the external surfaces of the ashlars of the vertical walls as well as the fronts of the corbelled stones exhibit bold bosses, like the ashlar masonry of Italian Renaissance palaces.

In comparison with those of Argolis, the chambers on accircular plan present structurally nothing new besides the stepped internal surfaces. Their vault line is a steep pointed arch, the vault stones are backed with dry masonry, and the vault itself is closed by a horizontal stone slab as in Mycenae, though with a reduced span.(21.33 instead of 49.21 ft.). It is otherwise with those on rectangular or square ground plans. Men would not here give up a high dome, and they were not satisfied by making but two sides curved, leaving the other two vertical, as at the Royal Tomb at Cnossos, no indeed -- they carried all four external walls vertically to a certain height and then vaulted obliquely from these the four surfaces of the ceiling, i.e., they placed a high square pyramid on the former as a ceiling. If changed into the curved form, they w would have had the cloister vault, but which the Roman-Augustan period first attempted. The visible stepping of the vault stones was retained, a conical inserted slab formed the termination, as sometimes shown on the indeed contemporary Etruscan tombs.

An entirely new structural problem meets us in the so-called royal kurgan (royal tumulus); to erect a conical vault over a square room, where the four angles of the substructure lie in the circumference of the circumscribed circle, the base of the cone. By the intersection of the vertical planes and the conical surface are produced four hyperbolic side arches, between whose springings (imposts) and vertexes extend four conical

pendentives joining in a circular base on which then rises the conical vault. The pendentives and the dome above them are constructed by corbelling out the courses -- which can only be of advantage for the former technically -- that likewise appear on the visible surface of the interior. The conical vault is closed by a plain stone slab, and thus it does not show the pure conical form to the apex, but cuts this off at the crown. (Fig. 55).

A conical sinking in the lower surface of the closing slab does not exist, like that executed at the Tomb of Atreus. The backing and earth covering is constructed in the same manner as in the other subterranean tombs mentioned. Just as in the Etruscan tombs near Orvieto, the acute angles, that must be produced by dressing off smooth the visible surfaces of the vault stones in the interior, are avoided -- these indeed only by cutting off the rectangular angles,-- and it was the s same technical idea, that permitted the master of Pantikapäon to leave the full angles in the interior and to reject such a beautifully smoothed uniform surface, like that in the Tomb of Atreus. Under heavy pressures of the stone rings, the danger of breaking off the angles was greater, when the corbelling was carried to the vertex, especially in the upper courses.(?).

The group of tombs in Pantikapäon must be placed in the 6 th or 5 th century B.C., thus at about the same time as were solved the same problem in Persia in the palace interiors of Sarbistan and Firouzabad in a different way. In Pantikapäon by conical pendentives, in the Persian palaces by trumpets. The former received their completion in the great Byzantine structure of S. Sophia about 1000 years later, but the latter remained during the entire western middle ages in control of the transition from the square substructure to the domed upper portion on a circular plan.

Near Mycenae are also to be mentioned four domed tombs on t the western and northwestern slopes of the hill, on which the city stood, whose vaults have fallen. A fifth -- thus being seven in all -- was likewise found in the vicinity of the general burial place of the city.

Of other domed tombs found in Greece, there may yet be ment-

mentioned tholos near Menidi, Orchomenos and Pharis near Sparta near the Heraion south of Mycenae and near Volo in Thessaly.

Valmin analyses the tholos at Kopai in Boeotia, i.e., a domed structure there, as a remarkable work. "It is a circular structure, somewhat depressed-pointed at its apex; the top-most stone is said to join the entire structure together," which which was not exactly the case. Also placed at the foot of a hill, like the Tholos of Atreus, this moderately domed tomb of antiquity, the Tholos in Orchomenos, is now half destroyed. It consisted of a large circular apartment, the dromos, and an adjacent rectangular chamber, which was built of green slate, the quarry for which has been located in the vicinity of Lebadeia. The dimensions of the entrance doorway were almost exactly the same as in Mycenae, and the diameter of the domed interior is only 2.28 ft. less than there. Right courses ab-ove the floor are entirely preserved and 18 are partially so. Above the 5 th course, almost every other stone shows prepar-ver the architraves of the small sepulchral chamber."

1. Fig. 68 is reproduced from Schuchhardt. Plate at p. 240.

The holes and bronze pins there form a continuous system of five points at which bronze rosettes may have been fixed.

of slate slabs 0.98 ft. thick resting thereon, which were dec-orated by a sculptured spiral pattern enclosed by a border of wise the walls were covered by finely ornamented slabs, but of marble.

drawing from the copy in the British Museum in London), and o-there in the Palace at Tiryns. All are to be referred to Ass-

mentioned those near Menidi, Occhomenos and Pharis near Amyclea, near the Heraion south of Mycenae and near Volo in Thessaly.

Pausanias mentions the Treasury of Minyas at Orchomenos, i.e, a domed structure there, as a remarkable work. "It is a circular structure, somewhat depressed-pointed at its apex; the topmost stone is said to hold the entire structure together," wh which was not exactly the case. Also placed at the foot of a hill, like the Tholos of Atreus, this wonderful domed tomb of antiquity, the Tholos in Orchomenos, is now half destroyed.It consisted of a large circular apartment, the dromos, and an adjacent rectangular chamber, which was built of green slate, the quarry for which has been located in the vicinity of Lebadeia. The dimensions of the entrance doorway were almost exactly the same as in Mycenae, and the diameter of the domed i interior is only 3.28 ft. less than there. Eight courses above the floor are entirely preserved and 12 are partially so. Above the 5 th course, almost every other stone shows preparations for fastening metallic decorations, which also extend over the architraves of the small sepulchral chamber.

*1. Fig. 56 is reproduced from Schuchardt. Plate at p. 340.*

The holes and bronze pins there form a continuous system of five points at which bronze rosettes may have been fixed.

The chamber was sunk downwards into the rock like a shaft; the walls were faced with masonry and the ceiling was formed of slate slabs 0.98 ft. thick resting thereon, which were decorated by a sculptured spiral pattern enclosed by a border of rosettes, and by an inserted central panel (Fig. 56 [2]). Likewise the walls were covered by finely ornamented slabs, but of marble.

*2. Similar ceiling patterns in stucco with painting were a also found in the Palace at Gnossos (see Fig. 38, original d drawing from the copy in the British Museum in London), and others in the Palace at Tiryns. All are to be referred to Assyrian or Egyptian origin. See Grammar of Ornament by Owen Jones. London. 1856. Pls. 10, 11.*

In Orchomenos were also found fragments of several paintings, that belong to the early Mycenaean stratum, made known by H. Bulle in his comprehensive publication; Orchomenos. I. Die Al-

älteren Ansiedelungsschichten(Abhandlung der K. Bay. Akad. d. Wiss. I Kla XXIV. II Abth. Munich. 1907). A piece 6.30 by 5.56 ins. is assumed to represent a building with windows, according to p. 72 of the text. Over a white transverse beam appear ends of round logs, on which again lies a transverse beam, above which is to be found the well known half rosette or palm ornament, painted on terra cotta or wall plaster, likewise carved in stone on the structures in Cnossos, Mycenae and Tiryns, where it frequently appears.(See Fig. 59, after the above work of H. Bulle. Pl. 28).

The vertical pillars are painted red and different blocks are separated from each other by reddish-brown or black bracket l lines. The chess-board pattern of the wall is black and white, the ends of the beams are alternately red and blue, and the palm-leaves are colored blue and white, as in Tiryns.

The domed Tomb discovered near Menidi [1] is built of courses of quarried limestone blocks, which are irregular, only being roughly dressed with the hammer, and they are set on each other without mortar, but well chinked with spalls. The diameter of the tholos is 27.5 ft. with an original height of 29.5 ft. But the entrance doorway is constructed of more carefully dressed stones of larger dimensions, and a peculiar mode of relieving the lintel was attempted by anchoring together the obliquely inclined walls by bond stones (Fig. 57), and this is to be considered. An allied construction is found in the Pyramid of Daschour for relieving the stone slab ceiling of the chamber of the tomb.(See Perrot-Chipiez, vol. 1, p. 227, 228. Fig. 58, taken from Fig. 152 there). A dromos 9.85 ft. wide and 91.0 ft. long leads to the entrance doorway, just as for the Tholos of Mycenae.

*1. See Lolling, Bohn, Furtwängler and Kohler. Das Kuppelgrab bei Menidi. Kais. Deutsch Arch. Inst. in Athens. Tech. Theil. p. 45-47, pls. 1, 2. Athens. 1880.*

The domed Tomb near Dimini,[1] located one hour from Volo, shows a round stone slab 4.72 ins. thick and 3.58 ft. diameter as the closing stone of the dome. The height of the interior amounted to 29.5 ft., its lower diameter being 27.89 ft. and the height of the entrance doorway 11.81 ft. Striking in the

chtl movement; these are colossal mounds of earth, frequently the burials, such as still exists at Sardes on the sea of Gyges, and on the hill terrace of ancient Smyrna and in other places, as memorials visible at a great distance.

proned the fire, and heap up the shot earth into a hill."

Hector's bones were placed in a golden box in the hollow sarcophagus, while bones were collected from the funeral pyre, and was then thrown out to Alpenor, "we heaped up a tomb, placed on its top a pillar, then fastened on high the finely polished oar - Odysseus also performed all divine rites to his father on rocky Ithaca.

Homer speaks of temples, of the tombs erected over the ashes of the heroes by Euryalus, of the mound over the ashes of Achilles, of the gate of the Gate of Lions at Mycenae, the so-called pit tombs. The narrow surface of the rock between the Cyclopean walls of the citadel, which was covered with earth, leveled, and supported a circularly covered with stone slabs. This ring of stones is also decorated by reliefs (4 sculptured and 5 plain were found, with a great many fragments of others). Beneath them and deep tor, cut in the solid rock, to which a sixth was later added, their average length and breadth being 1.66 and 2.84 ft. Within these were the skeletons of 12 men, 3 women and 2 children, [illegible] the dead. [illegible] the dead.

[illegible] Homer [illegible] Achilles, [illegible]

domed tombs mentioned is the agreement in the proportions of the dimensions.

Homer gives for his heroes a still different kind of sepulchral monument; these are colossal mounds of earth, frequently on a stone substructure and intersected by dividing walls, the tumulus, such as still exists at Sardes on the sea of Gyges, and on the hill terrace of ancient Smyrna and in other places, as memorials visible at a great distance.

"But they mass the monument in a circle, lay the stone base around the fire, and heap up the shot earth into a hill."

Hector's bones were placed in a golden box in the hollow grave beneath the stone cairn and covered by the pile of earth. Patroclus' white bones were collected from the funeral pyre, placed in a golden urn between two layers of fat, and the mound was then thrown up; to Elpenor, "we heaped up a tomb, placed on its top a pillar, then fastened on high the finely polished oar." Telemachus also thought of piling up a memorial to his father on rocky Ithaca.

Another species of sepulchre of the heroic period was discovered by Schliemann near the walls of the citadel in the vicinity of the Gate of Lions at Mycenae, the so-called pit tombs. The narrow surface of the rock between the Cyclopean walls of the first and second enclosures of the citadel, which is steeply inclined, was covered with earth, leveled, and supported a double series of vertical stone slabs set in a circle and horizontally covered with stone slabs. This ring of stones is about 88.58 ft. in diameter, with a narrow entrance on the north; at its centre stood a series of sepulchral slabs, some of which are decorated by reliefs (4 sculptured and 5 plain were found, with a great many fragments of others). Beneath them and deep beneath the layer of earth were 5 sepulchral chambers of oblong form, cut in the solid rock, to which a sixth was later added, their average length and breadth being 19.69 and 9.84 ft. Within these were the skeletons of 12 men, 3 women and 2 children, lying on pebbles, among which numerous remains of food were to be found, all being covered by a layer of clay, pebbles and of earth.

The walls of the tombs were lined with small quarried stones and they were covered by slabs of shelly limestone, which rest-

by shells of sheet copper. The edges of the shells were hammered together and fastened to the wood by means of copper nails.

Bronze and alabaster masks covered the faces; golden shoulder belts, bronze swords with golden handles and inlaid work, rings, golden vessels, silver cups, head-bands, golden crescents for sleeves, beautiful wooden buttons overlaid with gold plates, bracelets, idols, copper kettles made of plates riveted together, ornaments of rock crystal and amber, an alabaster vase, an ostrich egg with overlaid goldwing, Egyptian porcelain, etc., were near the dead, these objects now filling an entire hall of the rooms of the National Museum in Athens -- indeed one of the most interesting collections in the world. The ostrich egg and the porcelain indicate very ancient commercial relations between the inhabitants of the Argolic plains and Egypt, the latter have already been found in Babylon (now in Asiatic Turkey), in Sicily, on the coasts of Spain, Rhodes, opposite the island of Arados at Syrian, the city of the Phoenicians, Sidon, in Cilicia, and a bronze mask at Nola.

In stone monuments mycenaic, the Cyclopian style of masonry is found in perfect form in Jerusalem gate, and all climates of Palestine, Greek pieces of decoration are shown in Asia Minor.[1]

1. See Ritchie.

Here should also be mentioned the ruins of the Pyramids of Senoheo,[2] which are built of great polygonal blocks, partly with the use of mortar (the latter perhaps to be referred to a Roman restoration). The ruins consist of a rectangular building about 48.2 ft. long and 36.4 ft. wide; three sides are well preserved to a height of about 2.84 ft., while the fourth (western side) is greatly injured; at the eastern side is an entrance, through which one enters a narrow passage and from this the true interior chamber, about 28.8 sq. ft. in area, which was originally divided into two rooms. Whether this almost unique

rested on wooden beams, whose ends were covered and protected by shells of sheet copper. The edges of the shells were hammered together and fastened to the wood by means of copper nails.

Crowns and diadems of gold with stamped ornamentation lay on their heads, and golden masks covered the faces; golden shoulder belts, bronze swords with golden handles and inlaid work, rings, golden vessels, silver cups, head-bands, golden ornaments for greaves, beautiful wooden buttons overlaid with gold plates, bracelets, idols, copper kettles made of plates riveted together, ornaments of rock crystal and amber, an alabaster vase, an ostrich eggewith overlaid dolphins, Egyptian porcelain, etc., were near the dead, these objects now filling an entire hall of the rooms of the National Museum in Athens-- indeed one of the most interesting collections in the world. The ostrich egg and the porcelain indicate very ancient commercial relations between the inhabitants of the Argolic plains and Egypt; the golden masks point to Asiatic as well as Egyptian customs. The latter have already been found in Babylon (now in London), in Memphis (now in Paris), on the coasts of ancient Phoenicia, opposite the island of Aradus at Byblos, the city of the stonecutting Giblites, the supporters of the Phoenician ashlar style, the city of Zenobia on the Euphrates, in Kertch, in Olbia, and a bronze mask at Nola.

On these ornamental objects, the Phrygian style of decoration plays an important part, and all elements of assuredly Mycenaean pieces of decoration are shown in Asia Minor. [1]

1. *See Milchhöfer.*

Here should also be mentioned the ruins of the Pyramids of Cenchrea,[2] which are built of great polygonal blocks, partly with the use of mortar (the latter perhaps to be referred to a mediaeval restoration ?). The plan forms a rectangle of about 49.2 ft. long and 39.4 ft. wide; three sides are well preserved to a height of about 9.84 ft., while the fourth (western side) is greatly injured; at the eastern side is an entrance, through which one enters a narrow passage and from this the t true internal chamber, about 62.8 sq. ft. in area, which was originally divided into two rooms. Whether this almost unique

structure in Greece was a sepulchral and victory monument (the so-called polyandron) or a watchtower, or the like, is uncertain.

2. *See Lolling in Badaeker's Griechenland. P. 273. Leipzig. 1888.*

2. Building materials are their uses, tools for building, "transportation, cutting, scaffolds, contracts for execution, building prices etc.

Further the individual specialist of the architectural design and their details, acquaintance is to be made with the building materials. Also the Greek building of later antiquity, be will to give the Mediterranean water which are preserved.

Now, however, people not always, we find so as architecture exists, have been the preferred materials for embodying the structural ideas of every people. The Grecian means no exception thereto. A great part of the working tools have been the same from antiquity until now, or have remained similar: axe, hammer, torches saw and plane for dressing wood, hammer and chisel, lorbiches and drill for working the different kinds of stones. Marble and stones are for material work.

For building work were employed both lumber and Tools known, and Pliny in his Natural History (Gaius Plinius Secundus, Basel, 1. in the 16 ed. If is and it is known, for example, Aristotle writes of it from of old times. Long ago was the country of Ella were prized for making masts, and winter-oaks for shingles for roofs. Many of the later mentioned trees are trees-like a wooden of Gods-dominion in Greece and what is said of them there:-- beech, cedar, pine, fir, larch, linden, elm, poplar, alder, sycamore, yew, ash (mentioned in Homer as the least in building" merely, chestnut, apple, for and olives.

Great magnificence in building would not maintained the Egypt materials for initial cutting and dressing, for quarries the ancient-Greeks. In first place, there is an priority, beech, wood, walnut, mulberry pine.

Preliminary and preliminaries are knowns and Ebert-Jahrbuch Griechen und Römern by Hugo Blümner. II, p. 245 et seq. Berlin, 1875.

In the 89 rd book are mentioned of the metals, gold and silver, and in the 90 th, iron lead and copper, and of bronzes, Chalcedony, Corn, Amber, Amethyst, Jasper, Sapphire, Emerald, Sardonyx, Onyx, Carbuncle, Ruby, Hyacinth, Topaz, Chrysoprase, Sardius, Chrysolite, Beryl, Lapis Lazuli, Alabaster, Porphyry, Marble, Ivory, Pearl, Coral, Purple, Sea-Green, Sea-Purple, Sea-Blue, Sea-Green with the tortoises eye and Thericeen sand, with pens i. the 37 th.

3. Building Materials and their uses, Tools for working them, Transportation, Setting, Scaffolds, Contracts for erection, Building Prices etc.

Before the technical treatment of the architectural works a and their details, acquaintance is to be made with the building materials, that the Greeks employed in their structures, as well as with the conditions under which this occurred.

Wood, stone, bricks and metal, so long as an architecture exists, have been the preferred materials for embodying the structural ideas of every people. The Grecian makes no exception thereto. A great part of the working tools have been the same from antiquity until now, or have remained similar; axe, hammer, toothed saw and plane for dressing wood, hammer and chisel, toothless saw and drill for working the different kinds of stone; melting, casting and drawing out for working metal.

For building woods were employed both forest and fruit trees, and Pliny in his Natural History (Gaius Plinius Secundus, Hast. Nat.), in the 14 th, 15 th and 16 th books, for example, chiefly writes of 13 kinds of oak trees. Cork oaks from the country of Elis were prized for making wagons, and winter oaks for shingles for roofs. Many of the later mentioned trees are treated in evidence of their occurrence in Greece and of what is said of them there:-- beech, cedar, pine, fir, larch, linden, elm, poplar, alder, sycamore, yew, ash (mentioned in Homer as the shaft of Achilles' spear), chestnut, maple, box and olive.

Their characteristics as building woods are mentioned, and their usability for certain purposes was emphasized, for example, for cabinet-making. Of fruit trees, there are cherry, plum, apple, pear, walnut, mulberry etc. [1]

*1. Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern by Hogo Blümner. II. P. 245 et seq. Leipzig. 1879.*

In the 33 rd book are mentioned of the metals, gold and silver, and in the 34 th, iron lead and copper, and of bronzes, Corinthian, Delian, Eginetan and Campanian.

In the 36 th book are described the kinds of stone, sawing them with the toothless saw and Ethiopean sand, with gems in the 37 th.

For the Greek period of the architectural works described by Pausanias in Sellas, Pausanias designates porous and crystalline limestone as the architectural materials: Eleusinian, Pentelican and Parian marble for the monuments of Athens, Island limestone for the temple of Zeus in Olympia, tufa for the terrace in the Altis there. For the Temple of Athena in Pellene he briefly mentioned inland stone; the enclosing walls of Amphissa were of black inland stone; the buildings of Messenia and Tegea were famous for the beauty and joining of the stones; in Megara was mentioned as peculiar as unusually white shelly marble, which was softer than other marble. For the Temple of Artemis at Ephesus the neighboring quarry of Coressia supplied the splendid white marble material, and for the [illegible] by Pausanias as excellent light gray porous limestone. In Messenia, Sparta and Elysia, a yellow porous limestone came in [illegible] coating, and which could be laid up in pieces of any dimensions.

Of the kinds of stone chiefly employed in the Greater modern country, the following are to be mentioned.

[illegible] yellow to reddish-brown, iron-colored cellulose sper, from [illegible] the Nymphs and of the Mission, was more commonly used in the [illegible] foundations of the old Temple of Athena on the acropolis of Athens).

2. The Kara limestone from the vicinity of Athens, a lightwhite porous limestone, colored red or reddish in spots by iron nodules, frequently similar to travertine, was sawn into ashlars.(Foundations of the old Temple of Athena and of the Parthenon of Ctesion).

3. The limestone from Aste (Akkiles Ithon) at Piraeus, [illegible] superstructure as well, as shown by the Odeon of Herodes Atticus and the Theatre of Dionysos.

[illegible]

For the great series of the architectural works described by him in Hellas, Pausanias designates porous and crystalline limestone as the structural materials; Eleusinian, Pentelican and Parian marble for the monuments of Athens, inland limestone tufa for the Temple of Zeus in Olympia, tufa for the terrace in the Altis there. For the Temple of Athene in Pellene is b briefly mentioned inland stone; the enclosing walls of Ambrosos were of black inland stone; the buildings of Bassae, Mantinea and Tegea were famous for the beauty and jointing of the s stones; in Megara was mentioned as peculiar an unusually white shelly marble, which was softer than other marble. For the T Temple of Artemis at Ephesus the neighboring quarry of Corressos supplied the splendid white marble material, and for the buildings in Syracuse the Latomia within the limits of the city furnished an excellent light gray porous limestone. In Akragas, Selinus and Egesta, a yellow porous limestone came into use, that was well suited to permanently receivv a stucco coating, and which could be laid up in blocks of any dimensions.

Of the kinds of stone chiefly employed in the Grecian mother country, the following are to be mentioned.

1. The bluish-gray dense limestone, frequently veined with yellow to reddish-brown, iron-colored calcareous spar, from the quarries of Lycabettos, from the Areopagus, the Hills of the Nymphs and of the Museion, was more commonly used in the earlier period before the Persian war.(Pelasgian walls,and foundations of the old Temple of Athena on the acropolis of Athens).

2. The Kara limestone from the vicinity of Athens, a light white porous limestone, colored red or reddish in spots by iron nodules, frequently similar to travertine, was sawn into ashlars.(Foundations of the old Temple of Athena and of the Parthenon of Cimon).

3. The limestone from Acte (Aktites lithos) at Piraeus, of yellowish-cray to yellow color, a fresh fracture being white to light-gray, was chiefly used for foundations, but for the superstructure as well, as shown by the Odeon of Herodes Atticus and the Theatre of Dionysos.

4. Conglomerate stone, a kind of breccia, with white frac-

[illegible] rare, easily cut and sawn; mostly employed only in the [illegible] of walls.

[illegible]. The compact limestone from Eleusis, of dark gray or b[illegible] reddish color, was rarely used only for certain parts of [illegible] [illegible] of its color, it offers for technical reasons by reason of its hardness.(Uppermost step of the stairway of the Propylaion in Athens; window sills in the base structure; friezes of the Erechtheion).

[illegible]. The lower white and the upper blue-gray Pentelicus marble from the quarries above the demos of Pentele were employed as a building stone for great public buildings, especially during the time of Pericles.(Olympieion, Propylaion, Temple of Nike, [illegible], Erechtheion).

7. The lower white and the upper blue-gray marble from Hymettos were rare used during the period of Roman supremacy.

[illegible]. [illegible] was relatively little employed in Athens.(Poor tiles in Olympia; relief friezes of the Thoseion).

9. The upper and lower white Attic marble was [illegible] and used Parian and Naxian.

10. The gray, yellowish and red compact limestone of the Ionian system and the limestone conglomerate in the circumscribed area of Argos were especially employed for the prehistoric structures in Mycenae and Tiryns.

[illegible]. [illegible] from Doliana were used on the Temples in Tegea, Phigaleia, and also in Olympia.

12. The tertiary shelly calcareous rubber limestone was [illegible]ly wrought while fresh and was sawn into ashlars; most buildings in Olympia (Temple of Zeus, Leonion, Palaestra etc.) were [illegible]

[illegible]

[illegible]

14. The marble from Abras in Thessaly.

15. The marble from Carystos and southern Euboea, the [illegible] called Cipollino. Italy with the red and black [illegible]

fracture, easily cut and sawn; mostly employed only in the middle of walls.

5. The compact limestone from Eleusis, of dark gray or b brownish color, was mostly used only for certain parts of buildings, sometimes merely for decorativv purposes on account of its color, at others for technical reasons by reason of its hardness.(Uppermost step of the stairway of the Propyleion in Athens; window sills in the sace structure; frieze of the Erechtheion).

6. The lower white and the upper blue-gray Pentelican marble from the quarries above the demos of Pentele were employed as a building stone for great public buildings, especially during the time of Pericles.(Olympeion, Propyleion, Temple of Nike, Parthenon, Erectheion).

7. The lower white and the upper blue-gray marble from Hymettos were more used during the period of Roman supremacy.

8. The coarse-grained island marble from Paros and Naxos was relatiwely little employed in Athens.(Roof tiles in Olympia; relief frieze of the Theseion).

9. The upper and lower white Attic marble was quarried and used near Laurium and Sunion.

10. The gray, yellowish and red compact limestone of the chalk system and the limestone conglomerate in the ciccuit of the plain of Argos were especially employed for the prehistoric structures in Mycenae and Tiryns.

11. The light bluish-gray and also the yellowish-gray marble from Doliana were used on the Temples in Tegea, Phigaleia, and also in Olympia.

12. The tertiary shelly calcareous sinter limestone was easily wrought while fresh and was sawn into ashlars; most buildings in Olympia (Temple of Zeus, Heraion, Palaestra etc.) were built of it, as well as the Temple in Corinth.

There were further employed for building purposes:-

13. The marble from the valley of Cinus near Sparta.

14. The marble from Atrax in Thessaly.

15. The marble from Carystos and southern Euboea, the so-c called Cipollino. This with the red and black marbles were also chiefly employed for certain parts of buildings, preferably

of the so-called etos of Hadrian, and for the heroes of Herodes Attikos in Olympia.[1]

during the Roman imperial period, for example for the shafts of the so-called Stoa of Hadrian, and for the Exedra of Herodes Atticus in Olympia. [1]

*1. See Lepsius. Griechische Marmorstudien. From the Abth. d. K. Preuss. Akad. d. Wiss. Berlin. 1890. P. 11-51, 114-133. Also Gottgetreu, G. Ueber die antike Marmorsorten, ihr Vorkommen und ihre Verwendung im Altertum. Zeit. f. Bauw. 1883. P. 103-132. Also Durm, J. Ueber die naturliche Färbung des Marmors an den Bauten der Acropolis in Athen. Athens. 1871. P. 471. Lastly, Becke, F. In Min. und Petrog. Mitt. Edited by S. Tschermak. New series. (1879). P. 57.*

Taken generally, ashlar construction can already be proved in Athens after the 7 th century. Ordinary limestone and porous stone were employed on the buildings before the Persian wars, both for the foundations and the superstructure; to which was added breccia in the 6 th and 5 th centuries. At the same time was Parian marble utilized for the decoration of the buildings, as proved by cornices of structures, that belong to the time preceding the Persian invasion. Besides different kinds of island marbles, the Pentelican was most regarded. [1] With the beginning of the domination of marble, men employed the inferior materials chiefly for substructures alone or for backing walls.Parthenon, Erectheion, Propyleion). Still they were not entirely abandoned for facades. Theodore Wiegand [2] prefers to understand as porous stone (Poros) ordinary porous tertiary freshwater limestone -- tufa limestone -- of yellowish or whitish color, as that called by the ancients "poros" or "lithos porinos." The porous material used on the acropolis of Athens came from the peninsula of Akte, wherefore it was also designated as"Piraeus limestone." Also probably from the vicinity of Athens came a hard reddish limestone, where such a stone is still quarried on Hymettos near Kara, but which cannot be termed "porous", although usually so called. All structures on the acropolis built of ordinary limestone, it is customary to comprise under the name of "poros" architecture. [3]

*1 See Dr. Walther Judeich. Topographie von Athen. P. 3, 11. Munich. 1905.*

*2. See Th. Wiegand. Die archaische Poros-Architektur des A-*

[illegible] Diehl, Thasos, Athens, 1964.

3. See Ts. Wiegand.

Of course Parian marble are the pediment groups, metopes, cor-
nices of the enlarged ancient Temple of Athena on the acropol-
is, as well as [illegible] Parthenon.

Of Pentelican marble were made not only certain architectural
[illegible] is afforded by the older and the later Erechthe-
ion, the little Temple of Athena Nike, the Propylaion, the The-
seion, the monument of Lysicrates, and the Temple of Zeus Olym-
pios. After the end of the 5 th century, and especially in t
the 4 th and 3 rd was employed another sort, the dense blush-
[illegible] Hadrian, Theatre Dionysos, Stoas of Eumenes and of Attalos).
At the end of the 5th and the beginning of the 5 th centuries
[illegible] window sills of the Propylaion and as a frieze on the Erechthe-
ion. On the same structure was therefore employed marble and
ordinary limestone, differing both in color and hardness. De
[illegible] in the metopes of Selinus; then also on the Temple of Zeus at
Olympia the metopes of the cell wall are of marble and those
of the portico are of "poros." As a prominent example of the
use of mixed materials may serve the Temple of Apollo at Del-
phi, according to Herodotus (V, 62), and then a number of Hel-
lenistic structures, as for example, the Artemesion at Lusoi.
The sequence is then generally Pracis, poros limestone, and
[illegible]

[illegible] Temple [illegible]
masonides) built the temple more beautifully than was the den-
ign, for among other things, although they were only required
to construct the temple of tufa, yet they built the "front side"
of Cavia [illegible] The preliminary of [illegible], the tufa [illegible]
[illegible]

[illegible] dings at Delphi and of the consecrated gifts , both valuable
and interesting contributions to the knowledge of the materials-

*Akropolis zu Athen. P. 59 etc. Cassel and Leipzig. 1904.*

*3. See Th. Wiegand.*

of dense Parian marble are the pediment groups, metopes, cornices of the enlarged ancient Temple of Athena on the acropolis, as well as the pediment groups of the Parthenon.

Of Pentelican marble were made not only certain architectural members ~~between~~ the entire superstructure, evidence of which is afforded by the older and the later Parthenon, the Erectheion, the little Temple of Athena Nike, the Propyleion, the Theseion, the monument of Lysicrates, and the Temple of Zeus Olympios. After the end of the 5 th century, and especially in t the 4 th and 3 rd was employed another sort, the dense bluish-gray upper Hymettos marble for architectural structures. (Asklepion, Theatre Dionysos, Stoas of Eumenes and of Attalos). At the end of the 6th and the beginning of the 5 th centuries was used in some parts of buildings even the dense bluish-black limestone of Eleusis (Eleusinian marble), for example, for the window sills of the Propyleion and as a frieze on the Erectheion. On the same structure was therefore employed marble and ordinary limestone, differing both in color and hardness. De Dense white (marble) and porous limestone are found together in the metopes of Selinus; thus also on the Temple of Zeus at Olympia the metopes of the cell wall are of marble and those of the portico are of "poros." As a prominent example of the use of mixed materials may serve the Temple of Apollo at Delphi, according to Herodotus (V, 62), and then a number of Hellenistic structures, as for example, the Artemesion at Lusoi. The sequence is then generally breccia, porous limestone, and then Hymettos stone.

But of the Delphian Temple it is said:- - Thus they (the Alkmaeonides) built the temple more beautifully than was the design, for among other things, although they were only required to construct the temple of tufa, yet they built the "front side" of Parian stone. For uniformity of appearance, the tufa facades must have been covered by stucco.

H. Pomtow presents in his essay on tests of stone of the buildings at Delphi and of the consecrated gifts , both valuable and interesting contributions to the knowledge of the materials

of Grecian stone architecture. Besides the three kinds of Delphic-Pentelic stone, Paranesos stone, conglomerate and white G. Ulias stone, Pomow had 180 samples of stone determined by G. Lepsius in Darmstadt and has published the results.(1906).

The "Paranesos stone" was especially employed for walls, foundations, terraces and substructures, but was little used for the masonry of the superstructure. It easily cracks and splits, weathers rapidly and assumes a brownish-red color. Like the golden yellow patina of the pitic marble statuaries, this is occasioned by the iron particles existing in the limestone; "if by the weathering of the surface the lime be dissolved by rain water and carried away, then the iron contained therein is changed into brown iron ore (hydrated iron oxide)." The deceased geologist Professor Kropp in Gartsrube on the contrary, in his dissertation, denies a lichen as the cause of the coloring (see Partheon), that did not grow on the southern stone surfaces of the monuments (on account of the sea winds) and thus left the marble white, but which thrived on the eastern and western sides and produced the characteristic golden tone, but it soon died on the northern and left there a gray local tone. The [illegible] responsed to this explanation. But because insists that the [illegible]

The proper building stone of Pentelic light gray G. Ulias [illegible] for example, or it are composed the light green and yellowish of the great temple of Apollo. From one end of the G th [illegible] pic pentelicon, and that does not assume the weathered color of the Paranesos stone. Only a few blocks of it become rose red.

[illegible] the conglomerate stone, or more correctly of breccia,

of Grecian stone architecture. Besides the three kinds of Delphic-Epichloric stone, Parnassos stone, conglomerate and white S. Elias stone, Pomtow had 160 samples of stone determined by R. Lepsius in Darmstadt and has published the results.(1906). The "Parnassos stone" was especially employed for walls, foundations, terraces and substructures, but was little used for the masonry of the superstructure. It easily cracks and splits, weathers rapidly and assumes a brownish-red color. Like the golden yellow patina of the Attic marble structures, this is explained by the iron particles existing in the limestone; "if by the weathering of the surface the lime be dissolved by rain water and carried away, then the iron contained therein is changed into brown iron ore (hydrated iron oxide)." The deceased geologist Professor Knop in Carlsruhe on the contrary, in his time designated a lichen as the cause of the coloring (See Parthenon), that did not grow on the southern stone surfaces of the monuments (on account of the sea winds) and thus left the marble white, but which thrived on the eastern and western sides and produced the characteristic golden tone, but it soon died on the northern and left there a gray local tone. The coloring of the stone surfaces on the Parthenon would now correspond to this explanation. But Lepsius insists that the stone on the east and west sides of the Parthenon must contain more iron, than that employed on the north and south sides.

The proper building stone of Delphic light gray S. Elias limestone, bluish gray and nearly white, of uniform color and chiefly without veins and cracks. Dense, hard and with sharp angles, it does not flake off and only weathers with difficulty. For example, of it are composed the floor slabs and the stylobate of the great Temple of Apollo. From the end of the 6 th century, this stone remains the principal material of all Delphic buildings, and that does not assume the weathered color of the Parnassos stone. Only a few blocks of it become rose red.

Of the conglomerate stone, or more correctly of breccia, (limestone slate) were foundations and stone walls constructed from the end of the 5 th century.

From the fine-grained porous oolitic limestone of the quarry

In order to protect from the penetration of rain water and
were coated with lime plaster, that is in part preserved; a p
procedure, that was likewise retained on the buildings of the
Altis at Olympia, at Gyrtone, at Paestum, or Mycenae, at West-
ern, Greece, Sicily, Italy.

As a reason, Tomas distinguishes [illegible] of "natural" ar-
ous limestone (p. 238-271), 3 kinds of ordinary limestone and
5 sorts of marble in Greece. A list of the Greek monuments
from which were taken stone specimens for determination and t
their origin is given on p. 272-280 by Fontow-Lapsina.

Tomas, [illegible] the Greeks, [illegible]
earliest times. Of sun-dried bricks were built the upper walls
of the private houses, even a portion of the city walls of Ate-
[illegible] in Greece. [illegible]
[illegible]
[illegible]
[illegible].

Clay roof tiles were replaced by marble tiles in the [illegible]
country, but on the contrary, clay pipes were employed as wa-
ter conduits during all periods.

[illegible] Greek, the [illegible] [illegible]
[illegible] by [illegible]. [illegible]
[illegible]
not occur in the corresponding building accounts.

With the clay was mixed chopped straw. Cheese for this as
well as for calves' hair, clay, lime and coarse sand, and stop-
[illegible]
und payments for slaked lime, since the cut stones were [illegible]
together by wooden or metal cramps, and the sun-dried [illegible]
were joined by clay cement.

[illegible] material [illegible]
[illegible] coating of the external surfaces, or as a ground fo
[illegible]
[illegible] lime, mixed with water and sand or pounded clay [illegible]

near Corinth were the columns of the Temple there obtained, a and of the same material were also those of the Templeoof Apollo at Delphi.

In order to protect from the penetration of rain water and from weathering, all stone surfaces and architectural members were coated with lime plaster, that is in part preserved; a p procedure, that was likewise retained on the buildings of the Altis at Olympia, at Syracuse, at Paestum, on Egina, at Metapontum, Selinus, Akragas etc.

As a summary, Pomtow distinguishes 6 kinds of ("poros") porous limestone (p. 269-271), 3 kinds of ordinary limestone and 5 sorts of marble in Delphi. A list of the Delphian monuments from which were taken stone specimens for determination and t their origin is given on p. 273-286 by Pomtow-Lepsius.

Bricks, airdried and burned, have remained in use from the earliest times; Of airdried bricks were built the upper walls of the private houses, even a portion of the city wallsof Themistocles in Athens, while brick as a structural material in the Grecian mother country chiefly belongs first to the Roman imperial period.(See further what was said of Gournia, Section 3).

Clay roof tiles were replaced by marble tiles in the 6 th c century, but on the contrary, clay pipes were employed as water conduits during all periods.

For walls of sundried bricks, the external surfaces were protected by stucco. Examples of this are the city walls of Eleusis and of Athens; mentions of the burning of the bricks do n not occur in the corresponding building accounts.

With the clay was mixed chopped straw. Charges for this as well as for calves' hair, clay, fine and coarse sand, and stone spalls exist. But nowhere in the ancient period are to be found payments for slaked lime, since the cut stones were held together by wooden or metal cramps, and the airdried bricks w were joined by clay mortar.

Less as a building material in masonry, but rather as a protecting coating of the external surfaces, or as a ground for mural and ceiling paintings in the interior, was employed burned lime, mixed with water and sand or pounded clay potsherds.

ferred to a paste with woven stems. It served for preparing the interiors of buildings as well as for relief decorations and ornaments. [illegible] and public buildings, but it was not used in private buildings in the earlier period. In the Italian colonies it occurs in the 2 nd century B.C. and generally, when men commenced to decorate the walls of private houses.

[illegible] und Kunste bei Griechen und Römern. Vols. 1 and 2. Leipzig. 1875-1879.

Clay as a building material or for producing a level bed in [illegible] for a coating, it remained in all times a desirable material.

Bronze, later iron, and bronze again with the use of cast lead was employed in masonry only for increasing its stability and strength, but otherwise only for making tools and sculptures.

Likewise among the Greeks was gold the metal earliest [illegible] it was followed by copper, and that by bronze, when [illegible] preceded casting. Bronze was an important article among the Greeks.

Lead, like tin, was known to Homer; iron was not as frequently mentioned by him as copper. He was also acquainted with wrought iron and steel.[2]

[illegible]

[illegible] are again the highest success.

The kinds and special forms of tools for masonry, [illegible] they were made changed, and the hardest iron and steel [illegible]

In place of carbonate of lime also occurred the sulphate -- gypsum (gypsos). That most suitable for structural purposes was brought from Cyprus. Pulverized and mixed with water, stirred to a paste with wooden sticks, it served for preparing the "white-coating" (opus albinum) for covering the walls in the interiors of buildings as well as for relief decorations and sculptures. Its use was limited in Greece [1] to temples a and public buildings, but it was not used in private buildings in the earlier period. In the Italian colonies it occurs in the 2 nd century B.C. and generally, when men commenced to decorate the walls of private houses.

*1. See H. Blümner. Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern. Vols. 1 and 2. Leipzig. 1 1875-1879.*

Clay as a building material or for producing a level bed in rough masonry is provid on the structures of the heroic period; for a coating, it remained in all times a desirable material.

Bronze, later iron, and bronze again with the use of cast lead was employed in masonry only for increasing its stability and strength, but otherwise only for making tools and sculptures.

Likewise among the Greeks was gold the metal earliest wrought; it was followed by copper, and that by bronze, when forging p preceded casting. Bronze was an important article among the Greeks.

Lead, like tin, was known to Homer; iron was not as frequently mentioned by him as copper. He was also acquainted with wrought iron and steel.[2]

*2. See Dr. L. Beck. Die Geschichte des Eisens. 1. Abth. Brunswick. 1884.*

Both in thinness and in clean casting did Grecian bronze founders attain the highest success.

The kinds and special forms of tools for masonry, for dressing stone and wood from the most ancient times to the present day remained approximately the same, only the material of which they were made changed, and the hardest iron and steel were preferred and became exclusive.

A representation of such is given by the illustrations of the

stonecutters' tools found in Sicily (fig. 80) and see the Sec-
tion on tools for working metal, wood and stone in Sicilians. II.
p. 198-229.

The Greeks were acquainted with machines, which served for
setting stones:-

a. The plumb line (qaidelos), a piece of lead or bronze on
a cord -- an invention of Daedalus.

b. The level (diabetes), whose invention is ascribed to The-
odoros of Samos.

c. The level (gonis), made of iron or of wood. [1]

On a good road, man drove a wagon in 1 3/4 hours from Castel-
vetrano to the stone quarry of the inhabitants of Selinus, the
Cave di Campobello, which still affords to us conclusions cer-
ning to the mode of quarrying blocks of columns and sculpture
for the temples of Selinus.

but the high drums were cut out round in the solid rock and
smoothed on the external surface with reference to their dia-
cut around each shaft, in which the stonecutter must undertak
the preparation and dressing with the pick. As it is isolate
cella, separated only by thin walls cut parallel to the diam
iaeo series of the columns, there yet stand the drums
tant to the solid rock; they have diameters of 10.17 to 10.7
which was justified by the vast dimensions of the blocks and

corresponding finds in Gournia, those collected in Most Egyptian museums, which were models for the Greeks, as well as the stonecutters' tools found in Sicily (Fig. 60) and see the Section on Tools for working metal, wood and stone in Blümner. II. P. 193-233.

The Greeks were acquainted with machines, which served for setting stones:-

a. The plumb line (paidelos), a piece of lead or bronze on a cord -- an invention of Daedalus.

b. The level (diabetes), whose invention is ascribed to Theodoros of Samos.

c. The bevel (gonia), made of iron or of wood. [1]

*1. See also Dictionnaire des Antiquites Grecques et Romaines by C. Daremberg and E. Saglio. 3 rd edition. Paris.1881 - .*

On a good road, men drove a wagon in 1 3/4 hours from Castelvetrano to the stone quarry of the inhabitants of Selinus, the Cave di Campobello, which still affords to us conclusions relating to the mode of quarrying shafts of columns and ashlars f for the temples of Selinus.

The shafts were not cut from loosened prismatic blocks there, but the high drums were cut out round in the solidrrock and smoothed on the external surface with reference to their diminution. Narrow circular passages, 1.97 to 2.62 ft. wide, were cut around each shaft, in which the stonecutter must undertake the preparation and dressing with the pick. As if in isolated cells, separated only by thin walls cut parallel to the diminished shafts of the columns, there yet stand the drums still fast to the solid rock; they have diameters of 10.17 to 10.76 ft. with a height of 12.63 ft. Only after this preparation, which was justified by the vast dimensions of the blocks and the resulting difficulty of moving them, were they detached from the rock, when first at the bottom a groove 0.69 ft. wide and 1.31 ft. deep was cut around the shaft, that was followed by its detachment.(Fig. 62).

Dressed and loosened drums lie ready for removal in the vicinity of the blocks still fast in place. These mighty blocks of stone must have been taken about 7 1/2 miles over a hilly country to the site of the building.

of the sculpture. In obtaining great blocks, men appear to have

First the rough dressing of the blocks in the stone quarry likewise for the colossal sculpture in Paulos, where three sides were first dressed, before the loosening from the rock occurred. On the route from Pentelikon to the ancient marble quarries may still be recognized in part the ancient slides, at descending blocks, as well as some abandoned drums of columns.

Boubstein in his work on the Grecian temples in lower Italy

Apollo near Salinus may be seen all phases of the gradual, preparation. They may have been the following:- the drums were first roughly cut in circular form, but the beds were already

base for raising (setting), there remained on the external surface a strong boss directly opposite each other (projecting 7.97 ins. and 16.54 ins. wide), as shown by unused and unfinished drums on the acropolis at Athens. They were set on each

in Paestum and Sarnes), the flutes being only cut for a length on the lowest and uncommenced drums as guides, and then finished.

Koldewey and Boubstein further state concerning this on p. 124:- "Most columns are thus built of drums of different

quarries of Rocca di Cusa, dressed in round form with attention to the diminution. For this circular surface is then

For obtaining ashlars for walls, the ledge was laid bare vertically from 3.28 to 19.69 ft. The upper surface was dressed off level; grooves 5.91 to 7.09 ins. wide were cut, that detached ashlars 4.92 × 3.94 ft. and 1.97 ft. high.

Judging from the external walls of the Propyleion in Athens, where entirely constructed of ashlars, the procedure must have been the same. The final finish was given after the setting of the ashlars. In obtaining great blocks, men appear to have proceeded in ancient times in the same manner as at Campobello.

First the rough dressing of the blocks in the stone quarry itself, afterwards their separation from the solid rock. Thus likewise for the colossal ashlars in Baalbec, where three sides were first dressed, before the loosening from the rock occurred. On the route from Pentelikon to the ancient marble quarries may still be recognized in part the ancient slides, at which may be noted the arrangements for lessening the fall of descending blocks, as well as some abandoned drums of columns.

Puchstein in his work on the Grecian temples in lower Italy and Sicily (P. 123), says that on the columns of the Temple of Apollo near Selinus may be seen all phases of the gradual preparation. They may have been the following:- the drums were first roughly cut in circular form, but the beds were already carefully dressed; for more convenient transportation and perhaps for raising (setting), there remained on the external surface 4 strong bosses directly opposite each other (projecting 7.87 ins. and 16.54 ins. wide), as shown by unused and unfinished drums on the acropolis at Athens. They were set on each other in this condition (as exhibited by the incomplete temples in Egesta and Sardes), the flutes being only cut for a certain length on the lowest and uppermost drums as guides, and they were generally chiseled off only after the construction was finished.

Koldewey and Puchstein further state concerning this on p. 123:- "Most columns are thus built of drums of different heights (about 7 in number) as they come from the quarry, and as those not entirely detached from the rock now stand in the quarries of Rocca di cusa, dressed in round form with attention to the diminution. For this circular surface is then

correctly to the depth at which the edges between the flutes should appear, for example on the two columns of the colonnade, and thirdly the flutes are hollowed out in round form, surface, for example on column O, second from the north, and fourthly this working knife is also removed from the flutes, so that the column appears completely fluted, like the porphyrous on the spot.

The loading and transportation of the blocks to the site of the building, [illegible] ship. [illegible] ed by inclined planes (causeways), sledges or drags, wagons and ships, the latter when foreign material was to be procured.

An inclined plane or the construction of a causeway of the largest kind in order to procure building stones was indeed [illegible] to the Pyramids of Giseh, [illegible] like manner. [illegible] (Cam. R. [illegible] [illegible]) affords to us information concerning the transportation [illegible] building.

Fastened on wooden sledges, they were drawn by men, also bellock was made immovable on the sledge by roping it.(See Fig. 66 from Choisy, L'art de bâtir chez les Égyptiens, 1904, P. 112, 163.).

Of the transportation from the quarry to the building site, Vitruvius (book X, 3) says in relation to the drums of [illegible] ed in a reasonable manner, since they did not trust to the [illegible] sufficiency of the roads. "They combined four wooden timbers,

assumed first the division into 20 parts for the flutes and the surface is cut in as many sides, thus being the columns on the southern front and in most of those on the western side. Then secondly the angles of the prism are removed, perhaps accurately to the depth at which the edges between the flutes should appear, for example on the two columns of the opisthodome, and thirdly the flutes are hollowed out in round form, but only to leave the "working inch" on the finally intended surface, for example on column O, second from the north, and fourthly this working inch is also removed from the flutes, so that the column appears completely fluted, like the northeast column." These observations entirely agree with my own, made on the spot.

The loading and transportation of the blocks to the site of the building required further methods in many cases, that were not always of the simplest kind. Transportation might be effected by inclined planes (causeways), sledges or drags, wagons and ships, the latter when foreign material was to be provided.

An inclined plane or the construction of a causeway of the largest kind in order to procure building stones was indeed the causeway to the Pyramid of Cheops, whose construction required ten years. Egyptian and Assyrian reliefs (See A. H. Layard. Discoveries in the ruins of Nineveh and Babylon. London. 1853) afford to us information concerning the transportation of massive ashlars, prepared in the quarry, to the site of the building.

Fastened on wooden sledges, they were drawn by men, also being moved on wooden rollers by the use of levers, when the block was made immovable on the sledge by roping it.(See Fig. 62 from Choisy, L'Art be Batir chez les Egyptiens, 1904. P. 118, 135.).

Of the transportation from the quarry to the building site, Vitruvius (Book X, 2) says in relation to the drums of the columns and the architraves of the second Temple of Artemis at Ephesus, that the architects Chersiphron and Metagenes proceeded in a reasonable manner, since they did not trust to transportation by wagons, on account of the great weights and the softness of the roads. "They combined four wooden timbers,

whose thickness equaled a third of their height, into a frame
[illegible] the wooden axle-trees
plates and pins, set with cast lead. In the wooden timpers
of the frame were inserted corresponding iron rings in which
[illegible] ran. The pivot was also wrought in lead
of ox leather. The turning of the pins in the rings was en-
tirely unobstructed, so that the shafts were drawn by yoked
oxen and rolled forward with the pins turning in the rings."
"This procedure was also applied to the transportation of the
architraves." "They had constructed wheels of about 12 ft. diu-
meter and encircled the two ends of the architrave in the mid-
dle of the wheels; in like manner were the pins let into the
ends of the substructure blocks on the one hand, on the other
[illegible]
[illegible] of the "arrive" [illegible]
counted himself, later Hittorf, and in the most recent times E
[illegible]
ly adhered to the simple statement. Hittorf fastens the arch-
itrave within a cylinder of iron rods and places the wheels at
a distance from the ends. He rejects the dovetail plates. C
[illegible]
coded when only pins were used. Koldewey and Puchstein describe
the method of Metapontum to have been applied to moderately lar-
ge Sicilian temples of limestone, according to arrangements f
ound there by them (p. 180), by which they place the wooden
[illegible]
ion between the stone and the wheels by 2 × 8 = 16 wooden wed-
[illegible]
with cylindrical ends, as shown by the certainly later bronze
pins from Samothrace. (Fig. 38).

At the Temple restored in Paestum (see Vorschungen in Gene-
[illegible]
al distances of the facade are from 26.21 to 23.78 ft. and th
[illegible]
of the columns may be taken at approximately 4.52 ft. I ass-
[illegible]
to other strongholds in lower Italy, Sicily, Greece and Asia

whose thickness equaled a third of their height, into a frame corresponding to the magnitude of the stone. On each end of the shafts of the columns were fastened iron double dovetail plates and pins, set with cast lead. In the wooden timbers of the frame were inserted corresponding iron rings in which the pins turned. The frames were also strengthened by bands of ox leather. The turning of the pins in the rings was entirely unobstructed, so that the shafts were drawn by yoked oxen and rolled forward with the pins turning in the rings." This procedure was also applied to the transportation of the architraves." They had constructed wheels of about 12 ft. diameter and enclosed the two ends of the architrave in the middle of the wheels; in like manner were the pins let into the ends of the entablature blocks on the one hand, on the other into the rings. With the practical explanation of this procedure the great architect of the Louvre, Perralut, formerly occupied himself, later Hittorf, and in the most recent times K Koldewey and Puchstein also. These gentlemen have but slightly adhered to the simple statement. Hittorf fastens the architrave within a cylinder of iron rods and places the wheels at a distance from the ends. He rejects the dovetail plates. C Certainly greater security against bursting the stone was afforded when only pins were used. Koldewey and Puchstein desire the method of Metagenes to have been applied to moderately large Sicilian temples of limestone, according to arrangements f found there by them (p. 120), by which they place the wooden wheels distant from the ends, like Hittorf, and form a connection between the stone and the wheels by 2 × 8 = 16 wooden wedges. In the square holes for the pins, they place metal bars with cylindrical ends, as shown by the certainly later bronze pins from Baalbec.(Fig. 63).

At the Temple mentioned in Ephesus (see Forschungen in Ephesos, published by Oest. Arch. Inst. I. 1906. p. 223), the axial distances of the facade are from 20.21 to 28.78 ft. and th those of the longer sides amount to 17.15 ft. The diameters of the columns may be taken at approximately 4.92 ft. I assume that the architrave was also 4.92 ft. wide, and according to other structures in lower Italy, Sicily, Greece and Asia

Minor, that it consisted of 2 to 3 blocks in width and was only composed of a single block in quite small buildings (Figs. 64, 65; see the construction at the Parthenon, at Olympia, Paestum, and many other places), when the diameters of the columns did not exceed 1.97 to 2.30 ft. The lengths of the architrave varied in greater structures, for example, from dimensions of 14.76 ft. on the Temple of Poseidon at Paestum, 15.15 ft. at Selinus, 14.11 ft. on Egina, to 17.81 ft. for the middle passage of the Propyleion at Athens, and 14.17 ft. on the Parthenon. On the other hand, ceiling beams are found 21.33 ft. long, for example, at the Erectheion. In Ephesus only the architrave block ovvv whe middle intercolumniation of the pediment facade exceeded the usual dimensions, being 28.71 ft. But all were again surpassed by the magnitudes of the ceiling beams of the hypostyle hall in Karnak with 29.53 ft. from joint to joint. Thus the maximum of a loaded stone architrave or of a stone beam was not attained in Ephesus. Yet Egypt had long been open to the Greeks at the time of the erection of the Hellenistic Temple in Ephesus.

The columns were likewise in Ephesus built of separate drums. The lowest one of the "columnae caelata" was adorned by figures, and it was about 6.89 ft. high and 5.91 ft. in diameter, including the projections of the figures. That those above it exceeded this dimension of 6.89 ft. is not to be assumed, according to other structures (Priene, Sardes, Samos, Miletus, of 15 drums), while indeed in the very much later Temple in Aizani the columns were monolithic and 27.84 ft. high. As before stated, the blocks were only roughly cut in the quarry; thus men needed to pay no attention to any injuries to the angles or surfaces; the problem was only to bring them whole to the building site.

To transport the drums, which were as high as wide, and that contained about 282.54 cubic ft.(17.64 tons), presented no difficulties. They were scarcely furnished with iron pins and c could be more simply moved, on wooden rollers, for example. Further consideration was only required by the circumstance, if the plain drums exceed twice or thrice the dimensions of 6.56 ft., but which was not the case for the lowest one. Our assump-

assumption must relate to the succeeding cases, if [illegible] be correct. The dimensions of the architraves are given on the arrangement of the columns in plan. Blocks up to 28.71 ft. were required, for which 4.95 ft. was the height and 1.84 or 2.46 ft. the width, according to whether 2 or 3 pieces were taken for the width. These long and thin blocks, weighing over 14.84 tons, that were fashioned in wheels 11.51 ft. diameter, on account of their shape (Fig. 64), scarcely endured any movement of the vehicle, and a block would cause a fear of breaking in pieces the stone to be transported. Men resorted to the method described by Vitruvius, then combined the architraves in one block (at least 4.92 × 4.92 ft. in section), but this can no longer be proved.

[illegible] with Vitruvius, with which were levered the walls in the pediments; but our witness means for this, that the apparatus only succeeded well for short distances (600 ft.) and in a level country. (Fig. 66). But Vitruvius also describes an unlucky attempt of Ratonios to bring from the quarry an immense block (11.81 × 7.89 × 5.01 ft.). Ratonios desired to excel Ketagenes [illegible] drum thus constructed, he wound a rope, but pulling on this merely unwound it and did not move the stone forward. "The [illegible] right way."

How the architraves and drums of columns were brought down [illegible] the height of the ceiling entablatures. Since no great weight [illegible] stones. The connection of these together was by plates or

assumption must relate to the succeeding ones, if Vitruvius be correct. The dimensions of the architraves are given by the arrangement of the columns in plan. Blocks up to 28.71 ft. w were required, for which 4.92 ft. was the height and 1.64 or 2.46 ft. the width, according to whether 2 or 3 pieces were taken for the width. These long and thin blocks, weighing over 19.84 tons, that were fastened in wheels 11.81 ft. diameter, on account of their shape (Fig. 64), scarcely endured any movement of the vehicle, and a shock would cause a fear of breaking in pieces the stone to be transported. Men resorted to t the method described by Vitruvius, then combined the architrave in one block (at least 4.92 × 4.92 ft. in section), but this can no longer be proved.

An idea of the arrangement can be obtained from the rollers, with Vitruvius, with which were leveled the walks in the palaestra; but our witness means for this, that the apparatus only succeeded well for short distances (800 ft.) and in a level country.(Fig. 66). But Vitruvius also describes an unlucky attempt of Paionios to bring from the quarry an immense block. (11.81 × 7.89 × 5.91 ft.). Paionios desired to excel Metagenes and fixed the ends of blocks in wheels with diameters of 14.76 ft. and connected these together by wooden timbers. About the drum thus constructed, he wound a rope, but pulling on this m merely unwound it and did not move the stone forward. "The wheels indeed rolled, but he could not move the load along the right way."

How the architraves and drums of columns were brought down from Pentelikon and taken to the acropolis of Athens is not stated. Sledges, rollers, levers, pulleys, wedges, drags and inclined planes must indeed have done this.

For carrying up ashlar walls men must have employed pole and trestle scaffolds, as they are sufficiently represented on Egyptian and Roman reliefs.(Fig. 67).

For temples the cell walls were certainly first carried up to the height of the ceiling entablature. Since no great weight was to be supported by the stone courses, men might employ light poles or timbers bound together, which were divided into stories. The connection of these together was by plates or l

longitudinal poles. The stones could be brought up by laborers, and also by lifts, that were likewise employed in setting up the drums of the columns. The strong cell wall also facilitated the scaffold for the columns. Fig. 68 is based on a draw- by J. L. Hittorf, plates 8, 9 and III of the work; "Recueil d des monuments de Segeste et Selinonte," measured and drawn by J. L. Hittorf and L. Zanth. Paris. 1870. The general arrangement of the scaffold and of the hoisting machine for the erection of a Grecian temple. See also Chapter 4, page 525 et seq., in the text volume; "mechanical means that served to transport materials from the quarry to the site of the work and to hoist them into place".Also see A. Choisy, Histoire de l'Architecture. I. P. 273.

Vvtruvius (Book X, 2) supplies abundant information concerning the hoisting machines. One such working with 3 rollers is termed trispastos (three-ways), and the pentapastos had five. According to the weight of the stones was employed the windlass, the axle with a rope drum, the winch (windlass on the ground) or the treadmill.(Fig. 69).

Another kind of hoisting machine was merely constructed of a scaffold pole stayed by four guy ropes, and to it were attached the corresponding pulleys. Three lines of men could haul on this without a windlass and quickly raise the load. The machine was called polypastos (many ways), since the rope passed through many rollers, thus affording easy and quick handling. It was also used for loading vessels.(Cranes; Fig. 70).

A peculiar arrangement for pulling and setting is shown by the cell wall and floor slabs of the Heraion in Olympia, where these are perforated and have holes on the upper surface. The same arrangement is likewise shown by the oldest architectural remains on the acropolis of Athens, which are built into the north enclosing wall. It is also found there on one of the old poros capitals (northeast angle) and on capitals at the T Temple of Aphia on Egina. [1] At the Heraion we also find perforations on the stylobate steps, extending from the bed to the tread; it is assumed that these served for fastening the animals for sacrifice. Similar perforations are likewise found on the angles of the casemate piers in the fortress of Eurya-

The architect accomplished this by baskets full of sand, that be piled up to above the capitals, then gradually emptying the lowest ones, so that the dressed blocks slowly settled to their places. This was most difficult for the lintel of the doorway, which had the greatest weight. It did not at first succeed.

decoded him while asleep to not do this, for she would arrange the matter. It was all in order in the morning; it appeared

The immortals are no longer so kind now to the much troubled

modern period, excelling in the construction of war machines, were not so backward as to have employed sand beaps 55.82 ft. high to raise the architrave blocks in question!

sand, and he adds that the sacks of sand are indeed

Euryalos in Syracuse, that certainly served for fastening horses.

*1. J. Hittorf already called attention to these arrangements (pl. 89, p. 309 et seq.) and he also mentions them on a capital from the interior of the Temple on Egina.*

Perforations were indeed the earliest means for setting stones; after these probably come the U-shaped grooves and only then the lewis of three pieces, that of two pieces, and the tongs.(Figs. 70, 71).

According to the works at Olympia (II, p. 43), at the Treasury of Sicyon are assumed to have been used also the tongs (F (Fig. 70) for raising small blocks, besides the perforations. At the great Temple in Akragas the lower beds of the blocks of the capital (measuring 11.58 × 8.53 × 5.58 ft.) have two grooves (Fig. 72) in which were placed square iron bars, whose ends were joined by rope slings passed through the iron S, attached to the rope of the pulleys and thus hoisted.

Pliny (Hist. Nat. 36, Book 21) terms it a chief wonder, that for the Temple at Ephesus the architraves of such great weight could be hoisted so high, almost 55.78 ft. in this case.

The architect accomplished this by baskets full of sand, that he piled up to above the capitals, then gradually emptying the lowest ones, so that the dressed blocks slowly settled to their places. This was most difficult for the lintel of the doorway, which had the greatest weight. It did not at first succeed, the artist was in anguish and desired to kill himself. Artemis decided him while asleep to not do this, for she would arrange the matter. It was all in order in the morning; it appeared that the lintel had set itself correctly by its own weight. T The immortals are no longer so kind now to the much troubled and overburdened practitioner. But the engineers of the Alexandrian period, excelling in the construction of war machines, were not so backward as to have employed sand heaps 65.62 ft. high to raise the architrave blocks in question!

A Choisy objects, in describing the structural methods of the Egyptians (Hist. de l'Arch. I. P. 35) with reference to t the hints given in the papyrus Chabas concerning the use of sand, and he adds that the sacks of sand are indeed still in

use today for removing the centering of arches. It gives the [illegible]

of sand, at 0 the arbitrave is in its proper position.

The only thing that gives occasion for thought is the top of the [illegible] of sand. If we assume the [illegible] wall constructed wooden inclined plane, this would perhaps be more correct.(Fig. 75 [1] ).

1. According to the facts described, like the former great [illegible] at the time of the climax of mechanics in classic antiquity, [illegible] and fastened shafts of columns and architraves crossways in [illegible] building. From the time and the circumstances, I must usually [illegible] for "no."

[illegible] quire a road 30.00 to 39.27 ft. wide. So construct any moist- [illegible] further be very slow. The description in Vitruvius and Pliny [illegible] out the ancients would indeed have connected them in pairs at [illegible] definite distances behind each other, as still done in the [illegible] port to the building site, or of long iron wedges. A narrow [illegible] been the wheels in pairs, or be suspended from them in ropes, [illegible] thereby jolts on the uneven road could not impede the freely [illegible] suspended stones.(Fig. 76).

For the time required in the process, it may be stated concer- [illegible] ning to Strabo, Book XIV, Chapter I, 21:- "Ubersetzungen First [illegible] built the Temple of Artemis, which was later enlarged by one- [illegible]

use today for removing the centeringoof arches. He gives the following representation of the process.(Fig. 73). At A the architrave lies on rollers, at B. these are replaced by sacks of sand, at C the arhhitrave is in its proper position.

The only thing that gives occasion for thought is the top of the colossal bank of sand. If we assume in its place a well constructed wooden inclined plane, this would perhaps be more correct.(Fig. 73 [1] ).

*1. According to the facts described, like the former great sufferer Odysseus, I consider with a doubting mind, whether at the time of the climax of mechanics in classic antiquity, men really worked on banks of sand instead of wooden scaffolds, and fastened shafts of columns and architraves crosswise in wheels, thus being able to transport them to the site of the building. From the time and the circumstances, I must myself decide for "no."*

*Architraves 29.53 ft. long, with the enclosing framework and with a road for the ox team and drivers in a single series, require a road 36.00 to 39.37 ft. wide. To construct and maintain such is costly. Transportation in a single series would further be very slow. The description in Vitruvius and Pliny is indeed based only on hearsay, or what is still more probable, is reproduced as misunderstood. I believe in the wheels, but the ancients would indeed have connected them in pairs at definite distances behind each other, as still done in the transportation of great logs from the forest, or of dressed timbers (ceiling beams and roof timbers) from the carpenter's yard to the building site, or of long iron members. A narrow road suffices, the stone beams might be laid on the axles between the wheels in pairs, or be suspended from them by ropes, whereby jolts on the uneven road could not injure the freely suspended stones.(Fig. 75).*

*For the time required in the process, it may be stated according to Strabo, Book XIV, Chapter 1, 21:- "Chersiphron first built the Temple of Artemis, which was later enlarged by another. But when a certain Herostratos burned this, they built another more beautiful, for they collected the ornaments of t the women and likewise sold the old columns. Evidences for*

to the gods." But after the completion of the temple, which Archeiloros built a work of Deinocrates (course architect of Alexander), it procured the temple ornaments by an honorary title of the architect, who still fitted the altar almost exclusively with the works of Praxiteles. The old Temple was begun in 550, completed in 510 B.C., and destroyed by Herostratus in 356 B.C.; in 334 Alexander was in Asia Minor, his firmness was shattered in 333, Ephesus assumed the royal title in 304, and at the command of the King, Deinocrates rebuilt the temple in the Ionic style more splendidly -- perhaps better and "built Scopas -- have been buried with the execution of one or more of the "columns coelatae," which was only possible, if Ara fell not in the years 420-417, but very much later. If the rebuilding of the Temple in Tegea be described to him, in place of the one burned in 385 B.C., then must Scopas have been already an artist of renown. How old must he have been indeed, if one supposes that the figure ornament on the Temple in Ephesus was only the last work on the temple! Also if one assumes that the rebuilding was begun soon after the fire, then must Scopas have just commenced his work at the accession of Ephesus, thus at the beginning of the 3 rd century. Aristarchus (who is also designated as the inventor of the outline) was born in 327 B.C., he had indeed completed his universal studies in 307, and without a preliminary training, he could have accurately attained to his mathematical and mechanical results, he might be only a greater pupil of a greater teacher. And he was indeed not a youth, when he listened to his colleagues and they carried out the idea of their successors in transportation and no longer refused building scaffolds. They further only hauling the bolt of human arms and the strength of horses.

Yet a word on transportation by water and by land of the colossal stone blocks -- the obelisks -- in Egypt. Pliny first.

this are the decisions of the people made then. Alexander the Great, who offered aid (he wished to bear the costs of the building already spent and to be paid later) was rejected with the words:- "It is not seemly that a god should build temples to the gods." But after the completion of the Temple, which Artemidoros calls a work of Deinocrates (court architect of Alexander), it procured the temple ornaments by an honorary title of the architect, who still fitted the altar almost entirely with the works of Praxiteles. The old Temple was begun in 620, completed in 540 B.C., and destroyed by Herostratus in 356 B.C.; in 334 Alexander was in Asia Minor, his kingdom was divided in 323, Lysimachus assumed the royal title in 306, and at the command of the king, Deinocrates rebuilt the temple in the Ionic style more splendidly -- perhaps better said, "built anew." Then must also one of the greatest Grecian sculptors -- Scopas -- have been busied with the execution of one or more of the "columnae caelatae," which was only possible, if his fell not in the years 420-417, but very much later. If the rebuilding of the Temple in Tegea be ascribed to him, in place of the one burned in 395 B.C., then must Scopas have been already an artist of renown. How old must he have been indeed, if one supposes that the figure ornament on the Temple in Ephesus was only the last work on the temple? Also if one assumes that the rebuilding was begun soon after the fire, then must Scopas have just commenced his work at the accession of Lysimachus, thus at the beginning of the 3 rd century. Archimedes (who is also designated as the inventor of the pulley) was born in 287 B.C., he had indeed completed his university studies in 267, and without a preliminary training, he would have scarcely attained to his mathematical and mechanical results. he might be only a greater pupil of a greater teacher. and he was indeed not a youth, when he listened to his colleagues and they carried out the idea of their ancestors in transportation and no longer refused building scaffolds. They further, as generally assumed, were without steam and electricity, only having the help of human arms and the strength of horses.

Yet a word on transportation by water and by land of the colossal stone blocks -- the obelisks -- in Egypt. Pliny (Hist.

[illegible] Soon at, illustrating by his description the principle, that the transportation and erection of even the small obelisks was a far greater work than "the quarrying and cutting."

[illegible] - King Sungeo already bound his son to the case of one, to inspire the master of the work, since he feared that the workmen might not suffice for the task, and thereby provoke the anger of the stone to the lapopers, also for the benefit of the stone. 100,000 men were engaged in this work.[illegible]

[illegible] transported on obelisks on boats from Phoenix to Hellispolis, when he separed a canal from the Nile to the capital, and joined two broad built boats with small blocks of [illegible]

[illegible] were joined under the obelisk resting on [illegible] (Fig. 89 B, p. 26), he moulded together the two blocks of bronze and separate the stone from them (Fig. 76). The stone then lay in the water, thereby losing about 1/5 its weight. I [illegible]

Even the first site of the obelisk monument in Arsinoe, the [illegible] transferred it to the Forum, whereby resulted [illegible]

[illegible] assumed extraordinary, yet we learn nothing of its construction. [illegible]

with the stone under water? For the manner in which modern [illegible] such transportation, see the frontispiece of the so-called Discovery's needle in water from Alexandria to London.

On the Theban tablet on case [illegible], the well known writing [illegible] in the Egyptian Museum, Florence a representation (Fig. [illegible]). The relief indeed belongs to the Ptolemaic period, yet we should not forget, that the "Pharaohs" (little trees) of Rome

*Nat. Book 36, 14)anticipates by his description the principle, that the transportation and erection of even the small obelisks was a far greater work than "the quarrying and cutting."*

*With what energy the erection was executed, Pliny again supplies evidence:- king Ramses himself bound his son to the apex of one, to inspire the master of the work, since he feared that the machines might not suffice for the load, and thereby proving the safety of the stone to the laborers, also for the benefit of the stone. 120,000 men were engaged in this work.How the machines mentioned were constructed is unknown. The architect Satyrus transported an obelisk on boats from Phoenix to Gallixenus, when he carried a canal from the Nile to the obelisk, and loaded two broad built boats with small blocks of t the same stone, until the doubled volume made twice its weight, so that their ends were forced under the obelisk resting on t the bank, then were the stones thrown out and the boats rose and received the load. The obelisk was set on 6 cubes, and the architect was rewarded with $5000. A. Choisy (Egypte-procedes; Hist. de l'Arch.) indeed correctly understands the method, when in Fig. 23 B, p. 36, he couples together the two boats by beams and suspends the stone from them.(Fig. 76). The stone them lay in the water, thereby losing about 1/3 its weight. T Therefore the Egyptians, long before Archimedes, utilized the principle, that every substance loses weight in water.*

*From the first site of the obelisk mentioned in Arsinoe, the prefect Maximus transferred it to the Forum, whereby resulted further difficulties in its transportation by sea (Alexandria-Puteoli-Ostia-up the Tiber), but which were overcome without further trouble. The transport vessel everywhere aroused the greatest astonishment, yet we learn nothing of its construction. Did it perhaps consist of floating connected vessels w with the stone under water? For the manner in which modern times manages such transportation, see the transfer of the so-called Cleopatra's needle by water from Alexandria to London.*

Of the treadmill mentioned on page 98, the well known marble relief in the Lateran Museum affords a representation.(Fig. 69). The relief indeed belongs to the postaugustan period, yet we should not forget, that the "Graeculi" (little Greeks) of Roman

architecture rendered service. The lifting beam with pulleys, the traveler, the wheel and its men, besides the men pulling ropes -- nothing is forgotten in the interesting representation of the work, not even the branches on its top.

For the Temple built of tufa on Delos, the tiles were brought from Syros and cost 15 cents per pair, exclusive of freight and duty; with these they came to rather more than 18 cents. Clay (airdried) bricks were 1 ft. long and 1/2 foot wide, costing $7.20 per thousand; of which $6.48 was for making and 72 cents for value of materials. A Corinthian tile cost there at the factory 15 cents and 18 cents delivered in Athens. The ordinary tiles made elsewhere had the same price as the Corinthian, exclusive of the cost of transportation. [1]

*1. An obolus equaled one sixth of a drachme or was 3 cents.*

Up to $14.40 was paid per cubic foot of cedar wood; elm wood varied in price between $1.44 and $3.60, as well as ash wood.

The day's wage for a laborer, who boarded himself, amounted to from 27 to 36 cents, and even 45 cents. It exceptionally fell as low as from 18 to 22 1/2 cents.

According to the building accounts preserved, the building woods employed in various Attic buildings were cedar, elm, ash and cypress. Olive wood was also used for dowells. (For example, in the walls of Athens). They were largely brought from Macedonia, but the greater part was purchased in Corinth in the form of sills, beams, posts, pillars, piles, plates or rails, boards and thicker planks. The wooden dowells and anchors were externally coated with tar, as well as the woodwork of the roof and the joiner's work. The latter was also varnished with a resin. (Mastic varnish ?).

The timbers for building usually had large dimensions, for example, the ridge-beam of the Erectheion, which was 20 ins. wide and 23 1/2 ins. deep at the side (thus not to the top line), as may be deduced from the recessed apex stone of the pediment, lying on the acropolis. According to the contract for constructing the Arsenal near Zea, architraves 30 ins. wide and 27 ins. high were required, with planks and boards 5 6 ins. wide and 3/4 to 1 1/2 ins. thick.

Specifications for the erection of buildings were thorough

are frequently gigantesquetical, taking into account all possibilities.

Against lazy contractors, the officials in charge of the building always reserved the right to carry it or under their own management, if the former did not fulfill the requirements of their contract.

Light for this statement may be found in the following specifications for work for the Temple of Zeus at Lebadea in Boeotia, which date from the beginning of the 2 nd century B.C. It was found in the year 1877, out of a marble tablet 8.07 ft.high, 2.12 ft. wide and 6 ins. thick, filling two square sides by side, with 64 lines and 3000 letters.

This was first submitted to scientific criticism by Babelon in the essay "Le architecture Grecque commentationes epigraphicae."(Berlin. 1887). It was first made known to professional [illegible] the same subject under the title of "Un Devis de travaux Publics a Lissaqy.(Paris. 1889).

We give a verbatim translation from Babelon as follows:-

1. (If the contractor fails to complete any part of the work undertaken by him, then will the building commission for the temple afterwards cast this portion). The contractor then has to repay to the building commission for the Temple (the money paid him in advance) and the fifth part of the entire sum, for which he has undertaken the execution of his part of the entire works. (This money), together with any extra costs, and with the amount of the penalty imposed on him, shall all be collected from the contractor and his sureties by the building commission for the Temple. If this cannot be done, then shall their names be posted on the "white board." --- We,(the building commission for the Temple) award all metal work, and of stone work, the making of the steps for inscriptions and of the cons of the same process; but he (the contractor) shall make the foundation bases or extra work. For the limestone sculpture, he shall receive the fixed price of 80 cents each, for as many as he delivers, and for the cutting and painting of the letters, 3.60 per 1000 letters. --- But after he has received the ad-

and frequently circumstantial, takink into account all possibilities.

Against lazy contractors, the officials in charge of the building always reserved the right to carry it on under their own management, if the former did not fulfil the requirements of their contract.

Proof for this statement may be found in the following specifications for work for the Temple of Zeus at Lebadea in Boetia, which date from the beginning of the 2 nd century B.C. It was found in the year 1875, cut on a marble tablet 6.07 ft.high, 3.12 ft. wide and 8 ins. thick, filling two columns side by side, with 94 lines and 8500 letters.

This was first submitted to scientific criticism by Fabricius in the essay "De Architecture Graeca commentationes epigraphicae."(Berlin. 1881). It was first made known to professional circles by Centralblatt der Bauverwaltung.(1882, p. 5, 11). Choisy, the well known French writer on architecture, treated the same subject under the title of "Un Devis de Travaux Bublics a Livadie.(Paris. 1884).

We give a verbatim translation from Fabricius as follows:-

1. (If the contractor fails to complete any part of the work undertaken by him, then will the building commission for the Temple afterwards omit this portion). The contractor then has to repay to the building commission for the Temple (the money paid him in advance) and the fifth part of the entire sum, for which he has undertaken the execution of his part of the entire works. (This money), together with any extra costs, and with the amount of the penalty imposed on him, shall all be collected from the contractor and his bondsmen by the building commission for the Temple. If this cannot be done, then shall their names be posted on the "white board." --- We,(the building commission for the Temple) award all metal work, and of stone work, the making of the slabs for inscriptions and of the caps at the same prices; but he (the contractor) shall make the foundation bases as extra work. For the limestone ashlars, he shall receive the fixed price of 90 cents each, for as many as he delivers, and for the cutting and painting of the letters, $3.69 per 1000 letters. --- But after he has received the ad-

advance payment, the contractor shall forthwith (commence and) execute the work within 10 days, by engaging therefor at least 5 skilful workmen as assistants. But if he fails to perform any stipulation made in the contract, or is convicted of an error, then shall he be as severely punished by the building commission as he appears to deserve, for not performing the contract stipulations; and if one of his assistants be convicted of an error, he shall be discharged from the work and be no l longer permitted to assist; but if he be disobedient, then shall both he and the contractor be punished. --- If it be found advantageous during the work to change any of the prescribed dimensions by increasing or diminishing them, then shall he execute it in accordance with our directions.---

--- But the original bondsmen and the (first) contractor shall not be discharged from their obligations, until he, who has undertaken the work awarded the second time, shall have furnished sufficiently safe bondsmen. For all works previously executed, the original bondsmen shall be responsible to the last recourse. The contractor shall in nowise injure works now in the sacred precincts. But if he should injure anything, then shall he make it good again at his own cost, during a time to be fixed by the building commission for the Temple. And if the first contractor, who has charge of the setting, spoils a stone, then shall he furnish instead another perfect stone at his own cost, without delaying the work. He must remove the spoiled stone from the sacred precincts within five days; if he fails to do so, the stone will then belong to the sanctuary. But if he furnishes no substitute and does not make good the injury to the building, the building commission for the Temple will also deduct this. The cost thereof and one-half more (additional) shall be paid by the contractor and his bondsmen. If a stone breaks in two of itself, then the contractor in charge of the setting shall receive no punishment on account of this stone. --- If the contractors disagree in regard to one of the written stipulations, then after the members of the building commission for the Temple have been sworn, they shall decide the (matter) on the spot. More than one-half their number must then be present. Their decision shall be legal. --- If

the building commission stop the contractor from [illegible]
[illegible] --- [illegible]
to the law, he shall receive the first payment on account for
the portion of all inscription slabs unmarked by him, and i
the entire (sum as security). After he has shown that all
according to the contract and set with lead, to the satisfac-
tion of the building commission and the architect, then shall
he receive the second payment on account for all letters of t
the inscription, according to the fixed price and according
to the number computed on the basis of the original, when he
likewise deposits the tenth part of this(sum). Finally, after
he has completed the entire work, and after this is accepted,
limestone sashes set by him, as well as for all letters cut
by him afterwards, he shall receive the fixed price together
with the tenth, unless some deduction be made as a penalty.--
he shall execute it at the same rate, and shall receive such
--- If it happens that the excavation be rock firm, he shall
then pave it with as many limestone slabs as are necessary, a
er with the tenth. --- But he shall also place 12 cubs on the
on top, and has expended the existing nostrold as we direct.
when they project and hinder the cutting, and after dessert bo-
les have been drilled, he shall reset them and cast them prop-
erly with lead. He shall further insert in these(11 cubs) new-
so these cups, those 6 ft. long(and 5 ft. long to be at the
same price the others cost; these 3 ft. long, 4 in number, we
give payment on account for these cups, when he has shown that

the building commission stop the contractor from delivering t the stone, they shall make good to him the time for which they delay him.--- After the contractor has given bondsmen according to the law, he shall receive the first payment on account for the portion of all inscription slabs undertaken by him, and f for the caps lying thereon, when he deposits the tenth part of the entire (sum as security). After he has shown that all (slabs and caps) are completed, are true on all sides, finished according to the contract and set with lead, to the satisfaction of the building commission and the architect, then shall he receive the second payment on account for all letters of t the inscription, according to the fixed price and according to the number computed on the basis of the original, when he likewise deposits the tenth part of this(sum). Finally, after he has completed the entire work, and after this is accepted, he shall receive the tenth that was deposited. Also for all limestone ashlars set by him, as well as for all letters cut by him afterwards, he shall receive the fixed price together with the tenth, unless some deduction be made as a penalty.-- If any extra work be required for the benefit of the building, he shall execute it at the same rate, and shall receive what is coming to him therefor, after he has shown that it is good. --- If it happens that the excavation be not firm, he shall then pave it with as many limestone slabs as are necessary, a and he shall likewise receive what is due him therefor, together with the tenth. --- But he shall also place 11 caps on the inscription slabs already existing, after he has cut the slabs on top, and has extended the existing scaffold as we direct. He shall remove the iron cramps already let into the slabs, when they project and hinder the cutting, and after deeper holes have been drilled, he shall reset them and cast them properly with lead. He shall further insert in these(11 caps) keyed dowells and cramps and cast them in with lead, and he shall finish everything as already described above. --- We award also these caps, those 6 ft. long and 5 ft. long to be at the same price the others cost; those 3 ft. long, 4 in number, we will count each two as a single cap. --- He will likewise receive payment on account for these caps, when he has shown that

The inscription slabs are cut, set and dressed in with lead, and that the same placed on them are clamped above. He shall also receive payment for these, after depositing one tenth, exactly as contributed above.--- Also he has joined together the caps, and he shows that they are true, set with lead and soldered, are clamped on top and range perfectly with each other, then shall he wash the inscription slabs with soda, clean and mark the letters, for so long as he requires. -- but everything else, not mentioned in this agreement, shall be done according to the law and to the(general)ordinance for building the temple.

3. After the contractor, who by means of (other) tenders on the inviting commission for the temple, has undertaken to prepare and set the pavement slabs along the long side for the temple or Nave the "Aisle", and for the external passage around the wall on the side toward the south, to be of hard sandstone slabs, 12 in number, corresponding in size, breadth, and thickness to the pavement slabs already finished and set along the long side, besides which these are to be set,--- then after the [illegible] temple, and they have been found good and in accordance with the prescribed dimensions, he shall first dress the under side of all stones ten ans cut of wine, without dentels and trimmy blows; and with a sharp and fine tooth chisel, he shall dress all parts, which are to rest on the sills, and (those parts set on the filling) between the sills, for a width of at least two feet from the front edge joint; but the middle portion still uncut is to be dressed with a coarse tooth chisel, so he is to make everything true to a straight-edge, as long as the stone to be cut, and not less than 7 fingers thick and 8 inches high. Then he is to chisel away from the under sides of all pavement slabs that portion, which lies above the filling, from the rear edge joint for the given length [illegible] between the dressed surface and the filling, not more than a [illegible] the rear edge joints of the pavement slabs entirely true, straight and not curved, without defects, plumb, perfect by

the inscription slabs are cut, set and cast in with lead, and that the caps placed on them are clamped above. He shall also receive payment for these, after depositing one tenth, exactly as stipulated above.--- After he has joined together the caps, and has shown that they are true, set with lead and complete, are clamped on top and range perfectly with each other, then shall he wash the inscription slabs with soda, clean and wash the letters, for so long as we require. -- But everything else, not mentioned in this agreement, shall be done according to the law and to the(general)ordinance for building the Temple.

2. After the contractor, who by means of (open) tender of the building commission for the Temple, has undertaken to prepare and set the pavement slabs along the long side for the Temple of Zeus the "King", and for the external passage around the cell on the side toward the south, to be of hard Lebadean stone, 12 in number, corresponding in size, breadth, and thickness to the pavement slabs already finished and set along the long side, beside which these are to be set,--- then after the contractor has delivered the rough stones, uninjured, near the Temple, and they have been found good and in accordance with the prescribed dimensions, he shall first dress the under sides of all stones tru and out of wind, without defects and truly plane; and with a sharp anf fine tooth chisel, he shall dress all parts, which are to rest on the sills, and (those parts set on the filling) between the sills, for a width of at least two feet from the front edge joint; but the middle portion still uncut is to be dressed with a coarse tooth chisel, and he is to make everything true to a straight-edge, at least as long as the stone to be cut, and not less than 6 fingers thick and 6 inches high. Then he is to chisel away from the under sides of all pavement slabs that portion, which lies above the filling, from the rear edge joint for the given length and width, dressing the cut surfaces true as particularly specified for the under side, thereby producing an open space between the dressed surface and the filling, not more than a little finger in depth. --- But he shall likewise dress all the rear edge joints of the pavement slabs entirely true, straight and not curved, without defects, plumb, perfect by

square, accurately cut, and ready for the width of at least 6 flagstones on the three margins with a smooth, sharp, bevel chisel, carefully applying the red chalk test, but shall leave the yet untouched middle portion with the coarse tooth chisel, and he shall (then) uncover all the rear edge joints as a whole, (using therefor) a stone straightedge and carefully marking the red chalk test, not without correcting all straightedges by the (stone standard) straightedge preserved in the earlier projects, as often as we direct. He shall likewise cut the (front) large joints of the pavement slabs already in place, against which he is to set (the new ones), after he has corrected the line on the upper surface straight from the left portion, as well as along the longer side, and after he has drawn the line in presence of the architect, he shall cut away the existing allowance for cutting with the sander (and chisel), thus producing the given width, and making everything true and with sharp edges. He shall further true up the upper edge of all the pavement slabs, 12 in number, already set, by means of a straightedge on it. Long, 6 flagstones wide and 6 inches high, and shall test them with red chalk, using a smooth and sharp wide chisel therefor, and shall make everything straight, without defects and quite true, for a width of at least (?)inches. He shall dress this first morning after he has first cut some spots near the joints on each stone, true with the square and the straight line, according to which the dressing is done. In the same manner shall he work to the

edge joints of the pavement slabs already set, against which he is to set (the new ones), as at doors, and to fix the straightedge, exactly as specified for rear edge joints. ---

---

like stones on the upper surface, using the sharp fine tooth chisel on the sills, but a blunt chisel on the fitting, correspondingly to the finished and set (parts), and he shall know that everything necessary has been dressed. --- Then he shall set

them at the left, as will be indicated to him; each stone ac-

square, accurately cut, and indeed for the width of at least 9 fingers on the three margins with a smooth, sharp, broad chisel, carefully applying the red chalk test, but shall cut the yet untouched middle portion with the coarse tooth chisel, and he shall (then) undercut all the rear edge joints as at a door,(using therefor) a stone straightedge and carefully making the red chalk test, not without correcting all straightedges by the (stone standard) straightedge preserved in the sacred precincts, as often as we direct. He shall likewise cut the (front) ledge joints of the pavement slabs already in place, against which he is to set (the new ones), after he has stretched the line on the upper surface straight from the left, both in the portico, as well as along the longer side, and after he has drawn the line in presence of the architect, he shall cut away the existing allowance for cutting with the mallet (and chisel), thus producing the given width, and making everything true and with sharp angles. He shall further true up the upper edge of all the pavement slabs, 13 in number, already set, by means of a straightedge 20 ft. long, 6 fingers thick and 6 inches high, and shall test them with red chalk, using a smooth and sharp wide chisel therefor, and shall make everything straight, without defects and quite true, for a width of at least(9)fingers. (He shal dress this flat margin) after he has first cut guage spots near the joints on each stone, true with the square and the stretched line, according to which the dressing is done. In the same manner shall he work to the line (stretched) in the portico. Then shall he undercut the edge joints of the pavement slabs already set, against which he is to set (the new ones), as at doors, and to fit the stone straightedge, exactly as specified for rear edge joints. --- Before he sets the stones, he must dress the sills and the filling stones on the upper surface, using the sharp fine tooth chisel on the sills, but a blunt chisel on the filling, corresponding to the finished and set (parts), and he shall show that everything necessary has been dressed. --- Then he shall set the pavement slabs according to directions, commencing to set them at the left, as will be indicated to him; each stone against an edge joint, setting a wedge between them, so that it

accurately fits on top against the finished and set slabs.And

shall be be purchased by the building commissioner for the tem-
ple and the architects: neither shall be set the corner cerem-
monies, until an architect, by the building commissioner
temple, that he has been good Sinope red chalk and pure cir.-
-- be must show the dressing and jointing (of the slabs) to
the architect, and the edge joints and upper stone of all stones
ness to the assistant architect, while they are being moved;
(be small indeed) rub the upper sides with coarse sand,and
as soon as(the stones) are correctly set, neither pressed nor
in wine, (but rather) faultless, nothing scattered beneath them,
and they fit against each other accurately, while be is the
pressing outs away the (hard places) or the portions to be or-
dered with a fine tooth chisel made sharp, so far as they rest
on the walls, or with a blunt chisel, where they rest on the
filling; but be shall rub the edge joints with pure oil and
use a smooth broad chisel made sharp. When the work is fin-
ished and the joints have been washed with soda and cleaned off
with pure water, he shall fasten (the stones). The insertion
of dowels, cramps, and double-dovetails, as well as their we-
ight, and all setting in lead, shall be proved to the building
commission for the Temple by the contractor personally; he sh
shall not set anything permanently without this proof. But if
he shall find an flaw and defective, then be shall
he sash and set it anew; he shall then be punished by the co
building commission for the Temple and the Architects as severe-
ly as be appears to have deserved, had be not executed the pro-
visions of the contract; and if one of his workmen is convict-
ed of an error, he shall be discharged from the work and no
longer be permitted to labor thereon; but if he be discovered,
contractor. --- If it proves advantageous to the work to make a
any of the given dimensions greater or smaller, he shall do
all the pavement slabs beside each other, he shall dress the

accurately fits on top against the finished and set slabs.And he shall use pure oil and Sinope red chalk for all straightedges. If he does not use Sinope red chalk and pure oil, then shall he be punished by the building commission for the Temple and the Böotarchs; neither shall he set the stones permanently, until he has proved to the building commission for the Temple, that he has used good Sinope red chalk and pure oil.--- He must show the dressing and jointing (of the slabs) to the architect, and the edge joints and under sides of all stones to the assistant architect, while they are being moved; (he shall indeed) rub the under sides with olivv wree sap,and as soon as(the stones) are correctly set, neither bruised nor in wind, (but rather) faultless, nothing scattered beneath them, and they fit against each other accurately, while he in the dressing cuts away the (high places) of the portions to be dressed with a fine tooth chisel made sharp, so far as they rest on thessills, or with a blunt chisel, where they rest on the filling; but he shall rub the edge joints with pure oil and use a smooth broad chisel made sharp. When the work is finished and the joints have been washed with soda and rinsed off with pure water, he shall fasten (the stones). The insertion of dowells, cramps, and double-dovetails, as well as their weight, and all setting in lead, shall be proved to the building commission for the Temple by the contractor personally; he sh shall not set anything permanently without this proof. But if (in spite of this) he does set anything, then must he raise it up again and set it anew; he shall then be punished by the bu building commission for the Temple and the Böotarchs as severely as he appears to have deserved, had he not executed the provisions of the contract; and if one of his workmen be convicted of an error, he shall be discharged from the work and no longer be permitted to labor thereon; but if he be disobedient, then shall both he and the contractor be punished, and he (may) set no stone with lead, before he has fulfilled the prescribed decision. --- If it proves advantageous to the work to make a any of the given dimensions greater or smaller, he shall do this in accordance with our orders. --- As soon as he has set all the pavement slabs beside each other, he shall dress the

ter's service in the page header as the Country and finished cons, and true it of according to the great scientifiedere, burning red chalk and the tooth chisel, (first) cutting inderes reduce the stores, and with a level extending them towards the guide strips existing on the cavement slabs, after he has prepared for this cubes of dry wood from the wild olive tree. And as soon as he has shown that everything is straight,

As despite from the investigation found on Delos, that during the erection of a building, the building ground was enclosed by a wall of stretched cords, and that the average salary of an architect per year of 12 months was[illegible].00, which was likewise paid to the foreman of the work. Homolle therefore wishes to be designated by "architect" not the designated artist, but rather the superintendent. ("He is an artisan rather than an artist, a mere superintendent.").

The well known Lex Puteolana, the contract for building a covered passage to Puteoli, instructs us concerning the concurrence of a wooden protective roof and the covering of tiles, whose lowest course was to be fastened by iron nails; the contract for the repair of the city walls of Ancona attention concerning relating to a mixe of poor sandstone and a layer of straw and earth. The detailed description of the work for the present in Pliny's letters is about a simple roof, with the support of the roof timbers by stone piers, and all dimensions and spans of timbers, together with the durated scaffolding or the roof and the coating of clay or this, the building contract of Lebadea gives the conditions of the agreement, the inscriptions of Delos and Epidaurus describe the various kinds of materials, the places of origin of building materials, the construction of wooden coffered ceilings, the gilding of lilies and rosettes in the coffers, the ornamentation of fluted doors with ivory, the gilding of wooden parts, the protecting coating of the same, the tearing of the roof tiles, the public letting of the work at the lowest price, and the duties of the workmen and the superintendent; the inscriptions of the Erect-

the construction of the ceiling of the cell of Athena Poli-

upper surface in the same manner as the bearing and finished ones, and true it off according to the great straightedge, using red chalk and the tooth chisel, (first) cutting borders around the stones, and with a level extending them outwards from the guide spots existing on the pavement slabs, after he has prepared for this cubes of dry wood from the wild olive tree. And as soon as he has shown that everything is straight, entirely true ------.

We deduce from the inscription found on Delos, that during the erection of a building, the building ground was enclosed by a wall of airdried bricks, and that the average salary of an architect per year of 12 months was$129.60, which was likewise paid to the foremen of the work. Homolle therefore wishes to understand by "architect" not the designing artist, but rather the superintendent. ("He is an artisan rather than an artist, a mere superintendent.").

The well known Lex Puteolana,[2] the contract for building a covered gateway to Puteoli, instructs us concerning the construction of a wooden projecting roof and its covering of tiles, whose lowest course was to be fastened by iron nails; the contract for the repair of the city walls of Athens afforded information relating to a kind of roof sheathing and a layer of straw and earth, the detailed description of the work for the Arsenal in Piraeus informs us about a simple roof, with t the support of the roof timbers by stone piers, and all dimensions and spans of timbers, together with the doubled sheathing of the roof and the coating of clay on this, the building contract of Lebadea gives the conditions of the agreement, the inscriptions of Delos and Epidauros describe the various kinds of materials, the places of origin of building materials, the construction of wooden coffered ceilings, the gilding of lilies and rosettes in the coffers, the ornamentation of framed doors with ivory, the glueing of wooden parts, the protecting coating of the same, the tarring of the roof tiles, the public letting of the work at the lowest price, and the wages of the workmen and the superintendent; the inscriptions of the Erectheion inform us concerning the erection of the marble frieze, the construction of the ceiling of the cell of Athene Polias,

the roof of the cell of Arrochelius, the various painters and sculptors' work; others give facts relating to similar mur-
[illegible], [illegible], [illegible], [illegible]
ruses and other places.

In the preface to his tenth book, Vitruvius also speaks of the unpleasant character from exceeding the estimates of cost; then he states, that in the well known and great Grecian city of Ephesus, "there was indeed introduced in the early period of their successes a truly severe and yet not unjust law," according to which the architect must make an estimate of the cost on assuming the superintendence of a state building, for which he and his property were held responsible until the completion of the structure. If the cost corresponded to his estimate, then he was distinguished by commendatory decrees, even if for the case it which the cost did not exceed the estimate by more than one fourth. This excess was added to the total estimate, paid from state funds, and nothing further occurred. But if the cost exceeded the preliminary estimate more, then, the sum required to complete the work was taken from the means of the architect. He closes the tale with the wish, that old inherited laws also obtain on the Roman people such a law for public and private buildings, so that fellows without technical training could not practice their unwise arts unpunished.

The wish is old and ever young, and it will continue. The difficulties do not speak of the effect of the law.

[illegible]
le Corr. Hellen. Paris. 1880. 1882.
[illegible]
[illegible]
[illegible]
[illegible] etc. Vol. 3. Göttingen. 1841.
[illegible]
Chaley, A. L'ancenal de Pirse d'ores le deuis etc. Par-
[illegible].
Chaley, A. Les murs d'Athenes d'ores le deuis etc. Par-
[illegible]
[illegible]
etc. Paris. 1894.

the roof of the cell of Erectheios, the various painters and sculptors' work; others give facts relating to similar monuments in Eleusis, Troezene, Tegea, Corcyra, Eretria, Lesbos, Piraeus and other places. 1.

In the preface to his tenth book, Vitruvius also speaks of the unpleasant chapter from exceeding the estimates of cost; then he states, that in the well known and great Grecian city of Ephesus, "there was indeed introduced in the early period of their ancestors a truly severe and yet not unjust law," according to which the architect must make an estimate of the cost on assuming the superintendence of a state building, for which he and his property were held responsible until the completion of the structure. If the cost corresponded to his estimate, then he was distinguished by commendatory decrees, even for the case in which the cost did not exceed the estimate by more than one fourth. This excess was added to the total estimate, paid from state funds, and nothing further occurred. But if the cost exceeded the preliminary estimate more, then the sum required to complete the work was taken from the means of the architect. He closes the tale with the wish, that the immortal gods would also bestow on the Roman people such a law for public and private buildings, so that fellows without technical training could not practice their unwise acts unpunished.

The wish is old and evvr young, and it will continue. The Ephesians do not speak of the effect of the law.

*1. Homolle. Comptes et invent. des temples Deliens. Bull. de Corr. Hellen. Paris. 1890. 1886.*

*Fabricius, E. De architectura graeca commentationes epigraphicae. Berlin. 1881.*

*Müller, C.O. De monumentis Athenarum quaestiones historicae etc. Vol. 8. Göttingen. 1841.*

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*Choisy, A. L'arsenal du Piree d'apres le devis etc. Paris. 1883.*

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*Choisy, A. Un devis de travaux publics a Livadie. Paris. 1884.*

*Choisy, A. Notice analytique des principales inscriptions relatives aux travaux de construction chez les Grecs. Inscriptions divers. Paris. 1884.*

*Fabricius, E. Der Baukontrakt von Delos. Hermes. Jahr. 17. (1882). P. 1-23.*

*Fabricius.E. Die Skeuothek des Philon. Same. p. 551-594.*

*2. Wiegand, Th. Die Puteolanische Bauinschrift, technically explained. (Reprint from XX Supplement Vol. of Jahrbücher für Phililogie). Leipzig. 1894.*

We deduce from the inscription found on Delos, that during the erection of a building, the building ground was enclosed by a wall of airdried bricks, and that the average salary of an architect per year of 12 months was $129.60, which was likewise paid to the foreman of the work. Homolle therefore wishes to understand by "architekton" not the designing artist, but rather the superintendent. ("He is an artisan rather than an artist, a mere superintendent").[1]

1. *See the preceding references.*

In the preface to his tenth Book, Vitruvius also speaks of the uppleasant chapter of exceeding the estimates of cost; he there states, that an the well known and great city of Ephesus, "there was indeed introduced in the early period of their ancestors a truly sever and yet not unjust law," according to which the architect must make an estimate of the cost on assuming the superintendence of a state building, for which he and his property were held responsible until the completion of the structure. If the costs corresponded to his estimate, then was he distinguished by commendatory decrees, even for the c case in which the cost did not exceed the estimate by more t than one-fourth. This excess was added to the total estimate, was paid from state funds and nothing further occurred. But if the cost exceeded the preliminary estimate more, then the sum required to complete the work was taken from the property of the architect. He closes the tale with the wish, that the immortal gods would also bestow on the Roman people such a law for public and private buildings, so that fellows without technical training could not practise the unwise acts unpunished.

The wish is old and it will continue. The Ephesians do not speak of the effect of the law.

IV. MOVEMENTS, DEVIATIONS OF FOUNDATIONS, VIBRATIONS AND SOUND, HEAT AND CONDENSATION.

Securing the ground and foundation walls.

If a building were to be erected on ground saturated with water, then use could by special technical means be made use of to support the load.

Clay[1] generally such a procedure at the Atmosphere of Bukowan. This was found to be unusual against earthquakes and the formation of cracks in the earth; therefore a number of the crosses, but this means has other defects or [illegible] not also as a result. [illegible] did not have to cause much [illegible] used already on such an insecure building site [illegible] the foundations with it, such as was produced by a [illegible] ing and [illegible] it, wide cracks [illegible] it, [illegible] were observed to produce the necessary by spreading [illegible] on crossed in the trenches for the foundations, over which [illegible] into their work -, thus providing to a layer of concrete as a support.

[illegible] sand, wet, [illegible], [illegible] [illegible].

[illegible] had resorted[2] to a layer of sand between [illegible] or [illegible] walls in order to improve the ground [illegible] for the [illegible] of [illegible] in [illegible], [illegible] from the [illegible] period. This was made [illegible] 5.20 ft. deep and 5.50 to 11.25 ft. wide, above which rose the narrower [illegible] to a height of 14.40 ft. The [illegible] to prevent the fall of the walls of the trench by the [illegible]

[illegible]

[illegible]

[illegible]

[illegible] See Reports, W. Tegja und [illegible], Athens, 1891, [illegible]

[illegible] employed in antiquity, as for example, at the Treasury of [illegible]

[illegible] "the base stone"; this remains problematical but possible.

IV. FOUNDATIONS, CURVATURE OF HORIZONTALS, RISING MASONRY, DETACHED SUPPORTS, ENTABLATURES, CORNICES, CEILING AND ROOF, THEIR JOINTING AND CONSTRUCTION.

Securing the Ground and Foundation Walls.

If a building were to be erected on ground saturated with water, then men sought by special technical means to make this able to support the load.

Pliny [1] describes such a procedure at the Artemesion at Ephesus. This was first to be ensured against earthquakes and the formation of cracks in the earth; therefore a marshy site was chosen, but this again had other defects of a different kind as a result. Men did not dare to place such a heavy load directly on such an insecure building site and to sink the foundations into it, such as was produced by a temple 425 ft. long and 225 ft. wide, with columns 60 ft. high. Therefore it was prepared to receive the masonry by spreading broken charcoal in the trenches for the foundations, over which were laid sheepskins with their wool -. thus resorting to a layer of charcoal as a support.

*1. Pliny. Nat. Hist. Book 36. 21.*

Men had recourse [2] to a layer of sand between sheet pilings or protecting walls in order to improve the ground beneath it, for the Temple of Athena Ilias in Troja, that dates from the Hellenistic period. This was made about 8.89 ft. deep and 8.53 to 11.81 ft. wide, above which rose the narrower stone foundations to a height of 16.40 ft. The protecting arrangements were to prevent the fall of the walls of the trench by the s spreading of the sand, which was deposited in different layers and tamped. (Fig. 77). These were constructed of vertical w wooden posts 5.91 ins. square, driven at distances of 1.48 ft., and whose vestiges are still to be recognized, the open spaces between the posts being partly filled with small stones.

*2. See Dörpfeld, W. Troja und Ilion. Athens. 1902. p. 219, 220, where it is stated, that this kind of foundation was often employed in antiquity, as for example, at the Treasury of Sybaris in Olympia.*

"The ashlar foundation was removed by stone pillagers even to the last stone" ;; this remains problematical but possible.

Pile foundations for Grecian buildings are unknown to me, while they are not unusual for Roman structures.[1]

*Note 1. Besides well known structures in the german tributary provinces (Zehntland), see Vitruvius, Book 2, 10; the alder "which is driven in close piling in marly countries beneath foundation walls, supports immense loads of masonry and d does not decay. This may be seen in Ravenna in parcular, where all public and private buildings havv piles beneath their foundation walls." Also see pile structures in prehistoric times.*

To ensure against the effect of earthquakes, men sought protection in Ephesus by selecting marshy ground or low places as a building site for vast public structures. Egyptian engineers met these difficulties by structural means, when they brought into use ground arches in the foundations. [2]

*Note 2. See Perrot & Chipiez' Aegypten, p.535, 536, where are givvy the passages taken by them from Prisse d'Avennes, Viollet-le-Duc and Mariette, where attention is called to the fact, that likewise Alberti and other Renaissance masters refer to the use of ground arches in a variable building soil.*

Viollet-le-Duc gives an attractive investigation of the reason of this construction intended against earthquakes, and there results from it the necessity for diminishing the mass of the building upwards and for curving downwards the beds of the stone courses. The cube stands firm on a horizontal base, but the block B falls, when the ground line a b is raised, and which is not the case for a pyramidal body. But the courses may be loosened at the angle e.

In order to prevent a separation, he desires the courses to be curved downward.(Fig. 78 [3]).

*Note 3. Viollet-le-Duc. Histoire de l'Habitation Humaine. p. 84-88. Paris.*

A. Choisy states[4], that it is required by his opinion of g good construction of a wall, to level the courses; but the Egyptians departed from this principle, when they built the enclosing walls of Karnak, El Kab, Dendera, Phile and Ombo. He rejects a construction against earthquakes and determines, that for buildings on hills the walls do not exhibit a wavy

[illegible] of [illegible] or where the ground is prepared by [illegible]. The "unwrinkling" operation is therefore not performed by chisel-[illegible] in the ground concrete, since it is found in foundations on the solid rock.(Plate 1; Pages 78 to 80).

Note 1. L'Art de Bâtir chez les Egyptiens. p. 3) et sqq.

[illegible]

The "[illegible] block" of the courses around corners for [illegible] of the stones and was [illegible], especially in the [illegible] of the 18 th century.(See B.C.).

Continuous and ground water binds produce similar [illegible] in foundation and well masonry; as well crack [illegible] was today against the latter by ground arches and inverted v-vaults.

We find again recurrences of these [illegible] in one [illegible] region of Delhi in the great temple [illegible] the sacred precinct and of the [illegible]. The [illegible] of the [illegible] was prevented rather by the wavy beds, the stone [illegible] were not moved alone [illegible] but in continuous wavy lines (Fig. 54), which are so carefully [illegible] well executed otherwise. To make possible a true [illegible], the wavy surfaces are cut around to a width of 1.75 ins. For a length of courses up to 3.74 ft., a [illegible] up to 4.74 ft. and widths of 0.84, 1.48, 1.84 and 1.40 ft., or even more, I [illegible] not can be measured. On the eastern side the [illegible] accurately modelled stones are formed out of line [illegible] 2.34 ins.!

Dr. G. Cowton [1] believes, that the visible [illegible] of these [illegible] at Delhi, which may at best be compared with the [illegible] shapes of the pictures of the so-called [illegible] [illegible] for children, were only wrought [illegible] which is more than improbable on account of the [illegible] the angles. Yet there would not be excluded a [illegible]

[illegible] to be added to it, as the case on the [illegible] of [illegible] built city.(See Fig. 84, and for the [illegible] incorrigible, the [illegible] on Delhi). The [illegible] wall was built in the 6 th century B.C., and for an

coursing of the stones, and that such are only found on the banks of rivers or where the ground is permeated by water. The "undulating" coursing is therefore not produced by changes in the ground beneath, since it is found in foundations on the solid rock.(Plate 1; Figs 79 to 82).

*Note 4. L'Art de Batir chez les Egyptiens. p. 21 et seq. and Plate 1. Paris. 1904.*

The "undulations" of the coursing should oppose the sliding of the stones and was favored,especially in the buildings of the 18 th dynasty.(1597 B.C.).

Earthquakes and ground water might produce similar disturbances in foundation and wall masonry; we still protect ourselves today against the latter by ground arches and inverted v-vaults.

We find again recurrences of these Egyptian precautions in the earthquake region of Delphi in the great terrace walls of the sacred precinct and of the Marmaria. The slipping of the stones was prevented indeed by the wavy beds, the stone courses were not moved along straight horizontal lines, but in continuous wavy lines (Fig. 83), which are so carefully and well executed otherwise. To make possible a fine jointing, the wavy surfaces are cut smooth to a width of 1.58 ins. for a length of ashlars up to 5.74 ft., a height up to 4.76 ft. and widths of 0.98, 1.48, 1.64 and 1.80 ft., or even more, f for not all can be measured. On the eastern side the often strongly undulated stones are forced out of line as much as 3.54 ins.!

Dr. H. Pomtow [1] believes, that the visible faces of these ashlars at Delphi, which may at best be compared with the disjointed shapes of the pictures of the so-called patience games for children, were only wrought smooth after setting, which is more than improbable on account of the mode of dressing the angles. Yet there would not be excluded a subsequent finer dressingof the surface, especially when inscriptions were to be added to it, as the case on the ashlar walls of t the third city.(See Fig. 83, and for the mode of adding the inscription, the example near Agios Dheka on Crete). The Delphic wall was built in the 6 th century B.C., and for an

extent of 295.28 ft. is preserved to a height of 9.84 ft.[2] G. Perrot says on p. 329:- "All the lines forming this jointing are wavy with the most capricious bendings. This preference for the curved line complicates the work of cutting. Does it give to the whole greater resistance? I know not." The reply would be, that slipping is made more difficult.

*1. Beiträge zur Topographie von Delphi. By Dr. H. Pomtow. Berlin. 1889.*

*2. Recently it is also dated later and mentioned as a technical art work of a later period.*

Indeed to protect the Sanctuary of Apollo from the attacks of elemental forces in the earth's interior, the foundations of the Temple have been constructed in a way, that leaves scarcely anything to be desired in solidity and care. Standing on the solid rock, there is arranged for the porticos and vestibules a system of ashlar piers intersecting at right angles, which makes possible a great pressure of all walls on the ground and the laying of the floor slabs of bluish limestone, 6.78 ft. (also 6.95) long × 5.60 ft. wide and 1.28 ft. thick, which are all again connected together by iron I-cramps set in cast lead. (Fig. 85). A masterpiece of ancient construction, that nevertheless was disjointed by the force of the elements and the lust of men for destruction.

A similar network of intersecting walls in the ground is s shown by the foundations of the Altar in Pergamon. The building site of 112.20 × 120.74 ft. is divided into cells 10.82 × 8.20 ft., whose walls supported the floor slabs and the superstructure. The ashlars are of softer stone, joined without cramps and dowells, the cells being filled with earth and stone spalls. Its preservation till this time proves the goodness of the system and of the work. (Fig. 86 [1]).

*1. See Altertümer von Pergamon. Der grosse Altar, der obere Markt. By Jacob Schrammen. Vol. 1. Plate 3. Perspective of the foundations. Berlin. 1906.*

In certain cases it must occur, that the entire rectangular area occupied by the ground plan of the temple, which for most Hellenic temples presented the solid rock, was laid up in courses of regularly cut limestone ashlars, bonded but without

[illegible] there the excavation for the ceiling was not planned, but the foundations to accommodate such a vaulted ceiling

[illegible]

[illegible] directly on the solid rock, while on the south side they [illegible] a foundation courses of ashlars averaging 1.04 ft. high at the concavent corner are even 22 courses, and on the east side are [illegible] of varying heights and connected or different [illegible] on pieces ashlars 1.37 ft. high there exposed some [illegible] of [illegible] and [illegible] 0.95 and 0.45 ft. heights of

[illegible]

arrangements in the same courses. The faces in the lower courses are only roughly dressed with irregular joints; in the upper courses they have the dentated margins and courses on first [illegible] with rather complex arrangements for seating at the [illegible] (fig. 29) the bosses under the first [illegible] [illegible] for [illegible] the lower or crowner for having their closer and more to be cut off [illegible]). The foundation masonry on the west

[illegible]

of the substructure.

For the remains of the Temple - at Mycenae, the conditions [illegible] are comparable instead on certain corners. The [illegible] there being filled with cuboid masonry (fig. 30). (Ex-[illegible] of Tiryns and Mycenae).

[illegible]

[illegible] the foundation, the foundations increase towards the east so a [illegible] [illegible] the courses of ash-

mortar; there the excavation for the buiding was not planned, but the foundations in accordance with the natural position of the good ground were carried to different depths, for example, so that those of the Parthenon at the northeast angle rest directly on the solid rock, while on the south side may be counted 9 foundation courses of ashlars averaging 1.64 ft. high; at the southwest corner are even 22 courses, and on the west side are 5 of varying heights and composed of different materials; on poros ashlars 1.87 ft. high there succeed courses of poros and marble 0.95 and 0.92 ft. high. Courses of headers and stretchers alternate upwards, also headers and stretchers in the same course. The faces in the lower courses are only roughly dressed with imperfect jointing; in the upper courses they have the drafted margins and bosses or flat panels with rather complex arrangements for setting at the joints.(Fig. 87; the bosses under the flat panels indeed served for using the lever or crowbar for moving them closer and were to be cut off later). The foundation masonry on the west side projects but an inch or so beyond the step of the stylobate, while toward the south it projects about 4.92 ft. Otherwise the foundations correspond to the course of the walls of the superstructure.

For the pronaos of the Temple at Phigaleia, the continuous layers of uniform masonry are abandoned; piers of ashlar masonry are constructed instead at certain points, the intervals between these being filled with rubble masonry (Fig. 88).(Emplekton of Vitruvius and Diamikton of Pliny).

Foundation masonry of unequal depths is also employed at t the Heraion at Olympia, this also being on a varying site.The Temple partly rests on hard sand, partly on soft river sand. While the eastern portico has no foundation besides a sub--threshold, the foundations increase towards the east to a depth of 8.53 ft. with a width of 12.07 ft. The courses of ashlars in the foundations are not flush, but project irregularly beyond each other and widen downwards. For example, the course beneath the stylobate is narrower than it, while the next course is again wider. Both in this monument and in the Olympeion there, as well as on the Fountain-Sanctuary at Cadacchio,

[illegible] of the east, the labour needed considerable of a few [illegible] of [illegible] degree in the ground in accordance with [illegible] system, which did not employ foundations in concrete.

In a temple constructed of noble materials, the masonry of the foundation does not usually consist of the same, but of [illegible] exquisite material (see the Parthenon and Erechtheum), [illegible] in those built of porous limestone, the same kind of [illegible] [illegible] in the substructure as in the superstructure. [illegible] of Zeus at Lepsis, the Sicilian temples etc.). [illegible] foundation walls do not always rest on firm ground, they [illegible] always lessen on the rock; as likewise they have much [illegible] and narrow piers, as in segments on Mesopotamia, or Samos, — in the latter place so that the curtains might not be affected by earthquakes, and rest upon the earth [illegible] be found. (Association [illegible] 's hist. [illegible]).

Very elaborately constructed foundations of deep [illegible] piers are shown in a Tomenary in the Nile at Ghizeh, (Fig. 50), and the projections at the locations of the col-

[illegible]

[illegible] of [illegible] Greek temples with a view [illegible] system of construction are given in the work on Olympia, and [illegible]. 51 shows those of the Heroon in Olympia, by which the mode of execution is most clearly explained.

Note 1. See Lange und Oldyrde. Pattion in one volume, published in the Proceedings of the Association of Glowers. Berlin.

[illegible]

[illegible] are carried to different depths, and the layer of blue clay accordingly lies at various depths.

1

the foundation of the colonnade is separate from the foundation of the cell, the latter merely consisting of a few (1 or 2) courses of ashlars sunk in the ground in accordance with Egyptian custom, which did not employ foundations in courses.

In a temple constructed of noble materials, the masonry of the foundation does not usually consist of the same, but of a less expensive material (see the Parthenon and Theseion), while in those built of poros limestone, the same kind of st stone is used in the substructure as in the superstructure. (See Temple of Zeus at Olympia, the Sicilian temples etc.). The foundation walls do not always rest on firm ground, they are not always placed on the rock; we likewise find them sunk in low and swampy places, as in Magnesia on Meander, on Samos, in Ephesus,-- in the latter place so that the building might not be affected by earthquakes, and that cracks in the earth might not beafeared. (According to Pliny's Nat. Hist.36,21).

Very carelessly constructed foundations of detritus and of stone spalls are shown by a Treasury in the Altis at Olympia, (Fig. 89), and the projections at the locations of the columns in the interior of the Heraion there (Fig. 90). But this foundation in the latter plays a subordinate part, since thick slabs are laid over the mass of spalls and have a secure bearing on the continuous foundations of the internal columns and those of the wall of the cell. Descriptions of the foundatiions of this really oldest of Grecian temples with a mixed s system of construction are givvn in the work on Olympia[1], and Fig. 91 shows those of the Metroon in Olympia, by which the mode of execution is most clearly explained.

*Note 1. Die Funde von Olympia. Edition in one volume, published by the Directory of the excavations at Olympia. Berlin. 1881. p. 32-35; plates 34, 36.*

At the Temple at Lokri, the lowest courses of stones rest on a layer of blue clay 3.94 ins. thick, which projects beyond the stones. The foundations of the differnt parts of the building are carried to different depths, and the layer of blue clay accordingly lies at various depths. [1]

*Note 1. See Mitth. des Kaiser. Deutsch Inst. Röm. Abt. Vol. 5. Rome. 1890. p. 177-201.*

The foundations of Treasury VII in Olympia were placed on a heap of sand, and others are on brook pebbles.

Fixed starting points in regard to the foundations of circular buildings are given by Fig. 92 (Philippeion in Olympia, Tholos in Epidauros) and by the Arsionoeion on Samothrace.The three outer annular walls in Epidauros support the external colonnade, the wall of the cell, and the internal colonnade. The three inner annular walls served to support the foundation slabs. (See Fig. 93; perspective of the foundations at Epidauros drawn from nature.[2]).

*Note 2. I assume them as supports of the pavement slabs. Pomtow informs us in his Delphica (p. 71. Leipzig. 1909), that Thiersch holds that the so-called canals (sic) of the so-called labyrinth found under the pavement (what have these concentric walls to do with the labyrinth) to have been cavities f for strengthening the sound in a domed music tholos. That is barbarous!!*

In the foundation of the circular structure of the Arsinoeion on Samothrace, constructed of tertiary sandstone, the two lower courses show no holes for cramps; the succeeding ones have them, as uell as the surrounding projecting marble border, while the courses resting thereon exhibit none. The cramps themselves are wanting. On the sandstone foundation rose the marble structure.

At a Treasury in Olympia, the stones are held together by double dovetail cramps, just as this was observed and cited on the wall of the Altis at the base of the hill Kronion.[1]-- At the Temple of Qeus there, the cell walls rest on through ashlar slabs, that are held together by iron I-cramps set in cast lead. The pavement of the external and the internal portocos have through ashlars, which receive the pebble floor a and the coating of cement.

The foundation of the statue of the god is treated in a peculiar manner. Grooves were cut in the poros stones and pieces of compact white limestone were inserted in these groowes, on which were laid the joints of the thick bluish pavement slabs (Fig. 94), which rest on drafts and were connected together by I-cramps. The mode of jointing and fitting the marble floor around the internal columns is likewise interesting.

[illegible] wall.

At the temple in Kesse on Lesbos, the foundations consist of two inner enclosure walls, two longitudinal and two transverse, which together form a network of 8 rectangles. The two middle rectangles on the ends are filled by a complete foundation of the same kind, which probably does not extend as deeply as those of the previous walls. In the six exterior rectangles along the sides, a similar continuous foundation begins with the course at the lowest step, so that the courses of the steps of the temple, the crepis, form a complete frame, with the exception of the interior of the cell. The spaces within the rectangles formed by the foundation walls consists of plain tuff-tufa.

The substructure of the Temple of Athena at Priene rests in great part on the solid rock and only in the southwest corner found this over 6.50 ft. deep, consequently built of large masonry, in the construction of which the same principle was retained as for the southern foundations of the Erechtheum.

[illegible]

The foundation walls are not set to a plane and vertical: the movement begins at the stylobate, thus the portion of the foundation placed on the rock, has much considerably [illegible] through the rock, and not as a result of inaccurate measurement [illegible] a systematic widening of the foundation beyond the wall [illegible].

[illegible]

Foundation, substructure, courses in the original site, and from excavations on the body of the structure cannot occur without influence upon their physical condition and external appearance [illegible] with a practical one and [illegible]

(Fig. 95).

At the Temple in Messa on Lesbos, the foundations consist of the four enclosing walls, two longitudinal and two transverse, which together form a network of 9 rectangles. The two middle rectangles on the ends are filled by a complete foundation of the same kind, which probably does not extend as deeply as those of the principal walls. In the six external rectangles along the sides, a similar continuous foundation begins with the course of the lowest step, so that the courses of the steps of the temple, the crepis, form a compact whole, with the exception of the interior of the cell. The spaces within the rectangles formed by the foundation walls a re filled carefully with spalls of the same material, which c consists of black trachyte-tufa.

The substructure of the Temple of Athena at Priene rests in great part on the solid rock and only in the southwest on a foundation over 6.56 ft. deep, carefully built of large marble ashlars, in the construction of which the same procedure was retained as for the southern foundations of the Parthenon.[1]

*1. See Athen. Mitt. 17. 1892. p. 161; also Ergebnisse der Ausgrabungen und Untersuchungen in Priene in the years 1895-8. By Th. Wiegand & H. Schrader. Berlin. 1904.*

The foundation ashlars are not set to a plane and vertical; the northwest angle of the stylobate, thus the portion of the foundation placed on the rock, has sunk considerably --Apapparently on "account of the numerous cracks and holes extending through the rock, and not as a result of insecure construction." The leveling course has a drafted margin 2.76 ins. wide, the lower step is set about 2.76 ins. back from this edge, thus being a systematic widening of the foundation beyond the wall masonry.(See Fig. 96).

These different kinds of foundations, the quality of their execution, earthquakes, changes in the building site, and great depredations on the body of the structure cannot occur without influence upon their statical condition and external appearance, and therefore we must not examine with a critical eye and judge what now remains to us, laying down a scale, as if the works were now fresh from the hands of the architect.

Irregularities in the concrete of the horizontal [illegible] of [illegible] as well as in the overlying walls and columns exist but are confined without dispute on the Erechtheion, on the Propylaeon and Thesseion at Athens, on the temples in Corinth, Delphi, Paestum, Segesta, Priene and elsewhere. Likewise at the Temple of Apollo at Ferano, that exhibits a bulging projection on the south side, the architrave of the entablature for the column and the wall are recessed about 1.42 ft., and "unbelievable" have also occurred in the horizontal line. Of a "[illegible]" for optical reasons on their temples, the Greeks architects indeed knew little, and the technical advantages [illegible] seem to them 2000 years earlier, they can not account, [illegible] for their terrace masonry, and there without any [illegible] intelligence, but only by necessity.

If the curvatures on the temples particular were discovered [illegible], they would have a meaning as they too appear, but [illegible] rather cause have caused by accumulation from the elements -- and they are worthless to the conservator, worthless on account of the inaccuracy of their execution and the multitude of their amount, as for example in Angkor a [illegible] of 1.37 [illegible] in a length of about 197 ft. for the building, all this [illegible] below a horizontal!

[illegible] -- if there curvatures of the columns or [illegible] no sculptures and of the superstructure on a portion of residential monumental buildings, the following may be said.

The same feeling that required the entasis of the columns may have made a curvature of all horizontal lines on the building necessary. A passage of Vitruvius (book III, Chap. 4), [illegible] to be accomplished on Greek temples [illegible] the most of for the benefit of the preceding principle.

"But if a podium is to be made around the temple on three sides instead of the steps, it must then be arranged with reference to this, that the massive foundation, the principal body of the building, the main cornice and the overhang may be in accord with the podium itself, which is between the [illegible]

Irregularities in the coursing of the horizontal portions of the structure, in the foundation masonry, the plinth and steps, as well as in the overlying walls and columns exist and are confirmed without dispute on the Heraion at Olympia, on the Parthenon and Theseion at Athens, on the Temples in Corinth, Egesta, Paestum, Pergamon, Priene and elsewhere. Likewise at the Temple of Apollo at Delphi, that exhibits a better preservation on the south side, the ashlars of the substructure for the olumns and the cell are recessed about 1.18 ft., and "undulations" have also occurred in the horizontal line. Of a " curvature" for optical reasons on their Temple, the Delphian architects indeed knew little, and the technical advantages, already shown to them 1000 years earlier, they did not accept, excepting for their terrace masonry, and there without any higher intelligence, but only by hearsay.

If the curvatures on thestemples mentioned were directed do downward, they would have a meaning as they now appear, but would rather cause damage than benefit by accidents from the elements -- and they are worthless to the observer, worthless on account of the inadequacy of their execution and the smallness of their amount, as for example in Egesta a drop of 1.58 inch in a length of about 197 ft. for the building, all this being below a horizontal!

Concerning the nature of these curvatures of the courses of the stylobate and of the superstructure on a portion of Grecian monumental buildings, the following may be said.

The same feeling that required the entasis of the columns may have made a curvature of all horizontal lines on the building necessary. A passage of Vitruvius (Book III, Chap. 4), which relates to an arrangement on Roman Ionic temples was applied to the differently treated Grecian buildings, and made the most of for the benefit of the preceding principle.

"But if a podium is to be made around the temple on three s sides instead of the steps, it must then be arranged with reference to this, that the massive foundation, the stylobate, the body of the building, the main cornice and the cymatium, may be in accord with the podium itself, which is beneath the bases of the columns. The podium must be so leveled as to re-

cause an elevation above the middle of colline ancorita (sou-
illi ancorea); for if its entrace were made erectors porta-
cental, it would then appear concave or round-shaped to the
-ye. But now the adversectors and the little mnemonis are be
ne made to correspond to this will be further treated at the
end of the book", -- though this promised explanation has
been entirely lost. Hence this usage of "Itrovina, by its
sense of clearness and its incomplexness, has repeatedly ex
peacially in the last decades given occasion for multiferi-
ous reconcepes, discussions and interpretations.

The meters of measures and measurements in the 1st to consi-
ny look no notice whatever of this expression or reading and
of the plate of Vitrovius. First after the emancipation of
arcase from the Turkish yoke, came the ruins of antique tem-
[illegible]
ancches or the ancient communts; these were first due to the
munificous German architects, who were employed in Atrens un-
[illegible] ".

Ausova already appeared in the Allgemeine Zeuncitung in the
year 1865 [1] written by Hotter, then architect of the Greek gov-
ernment, in which it was stated, that the entablature of the
Parthenon was not rectincted, but that the architrave appeared
to be lowered at both angles, while all vertical joints still
[illegible]
the temple, woods varied size was also 1.52 inches.

[illegible]
in its practical parts. A contribution to the tempo of con-
struction of the temple by the Greeks. Allg. Ztung. 1862. S. 1871, 8
[illegible], 387".

Records by the Prussian Pennethorne containing the same
dotations appeared in the year 1863", and in 1866 were contain-
ed accurate measurements by Penrose of the Parthenon, the Ere-
ptheon, and the Theseion. In the very accidentous work of 3
bon letter are recorded all details in wrenaunsio, stoppes
and tenons in construction and the deformations, which the re-

ceive an elevation along the middle by oblique supports (scamilli impares); for if its surface were made absolutely horizontal, it would then appear concave or trough-shaped to the eye. But how the substructure and the little supports are to be made to correspond to this will be further treated at the end of the Book", -- though this promised explanation has been entirely lost. Hence this passage of Vitruvius, by its want of clearness and its incompleteness, has repeatedly and especially in the last decades given occasion for multifarious researches, discussions and interpretations.

The makers of sketches and measurements in the 18 th century took no notice whatever of this expression of feeling and of the hints of Vitruvius. First after the emanicpation of Greece from the Turkish yoke, when the ruins of antique temples became more accessible, commenced the more accurate researches on the ancient monuments; these were first due to the assiduous German architects, who were employed in Athens under King Otho.

Essays already appeared in the Allgemeine Bauzeitung in the year 1823 [1] written by Hoffer, then architect of the Greek government, in which it was stated, that the entablature of the Parthenon was not horizontal, but that the architrave appeared to be lowered at both angles, while all vertical joints still remained close. The same occurred at the Theseion, where all curved lines were parallel to each other, their rise amounting to from 1.57 to 1.96 inches for spans of 104.17 and 44.98 ft. Besides this curvature, there existed another directed towards the temple, whose versed sine was also 1.96 inches.

*Note 1. Hoffer, J. Das Parthenon zu Athen, measured anew in its principal parts. A contribution to the theory of construction of the temple by the Greeks. Allg.Bauz.1838.p.371,579, 387.*

Reports by the Englishman Pennethorne containing the same opinions appeared in the year 1846-7, and in 1851 were published accurate measurements by Penrose of the Parthenon, the Propyleion, and the Theseion. In the very meretorious work by t the latter are recorded all defects in workmanship, injuries and faults in construction and the deformations, which the st-

they form one nucleus of the publication, the existing curves of the stylobate and of the architrave on the Parthenon and Theseion are treated with especial predilection.[1]

Note 1. The level survey of the east and west sides of the Parthenon undertaken by the author in the year 1896, covers a general result with that of Penrose. It exhibits the similar rise of the courses and particularly shows that in most instances, that the four angles of the stylobate do not lie in the same horizontal plane. (Plo. 97).

The southernmost and northernmost angles, which are stated by Penrose to be higher than the northwest and northeast angles, were so found, although according to the author, those angles of the courses resulting from the mistake in the southeast one are [illegible]

The curve is divided in two parts in reference to a horizontal plane; their crests to not lie at the same height; the first reaches rise of 3.16 and 3.46 lns. for a short length of 1.3 ft. and a maximum rise of 1.65 and 1.10 inches.

[illegible] of building position is a matter of fact; the straightedges have been guided by rules of the laws [illegible], who have arrived into the question whether this curvature was original [illegible] in time by means of accidents.

Styles functions or the architecture of several steps, on the columns and colonnades, on the triglyphs and metopes, are reminded of the [illegible] of the Parthenon [illegible] different depths, or their construction with different essentially [illegible] of the [illegible] of the architrave, of the [illegible] of the [illegible] on the [illegible] of stone, of their [illegible] heights, distances between axes and inclinations, of the [illegible] are [illegible] among themselves, to which are added numerous other small irregularities, as for example, the circumstance, that the [illegible] and drops are not always placed exactly beneath the triglyphs, that the [illegible] of the [illegible] do not have the same size, often varying in width about

structures have suffered in the course of 25 centuries; since they form the nucleus of the publication, the existing curves of the stylobate and of the architrave on the Parthenon and Theseion are treated with especial predilection. [1]

*Note 1. The level survey of the east and west sides of the Parthenon undertaken by the author in the year 1879, agrees in general results with that of Penrose. It exhibits the similar high rise of the courses and particularly shows what is most important, that the four angles of the stylobate do not lie in the same horizontal plane. (Fig. 97).*

*The southeast and southwest angles, which are stated by Penrose to be higher than the northwest and northeast angles, were so found, although according to the author, those halves of the courses extending from the middle to the southeast and southwest angles are somewhat flatter.*

*The curve is divided in two parts in reference to a horizontal (since their origins do not lie at the samehheight) has t the maximum rise of 3.15 and 3.46 ins. for a chord length of 101.5 ft. and a manimum rise of 1.65 and 1.10 inches.*

The existence of the curved lines on the buildings and parts of buildings mentioned is a matter of fact; the statements given have been doubted by none of the later investigators, who have entered into the question whether this curvature was originally intended, or was caused by inadequate construction, or in time by means of accidents.

Onthe foundations or the substructure of several steps, on the columns and colonnades, on the triglyphs and metopes, one is reminded of the foundations of the Parthenon carried to different depths, of their construction with different materials, partly aapable of slight resistance, of the unequal pressures of the coursed steps of the superstructure, of the positions of the columns on two blocks of stone, of their different heights, distances between axes and inclinations, of the metopes and triglyphs not equal among themselves, to which are added numerous other small irregularities, as for example, the circumstance, that the regulas and drops are not always placed exactly beneath the triglyphs, that the abacuses of the capitals do not have the same size, often varying in width about

[illegible] lines are evident, also that loose and pieces of rotting are found cemented in, that the four angle columns are not of equal height etc.

The details were certainly but very small, and according as other building of similar masonry in the world, or ancient or modern times, may exhibit as few faults and slight defects in construction as the technically perfected Parthenon, undoubtedly proceed by the improvisations of human powers. Yet one sub-case in this way the construction of the best structures of the Roman, or even of the Renaissance period. Yet these small faults are avoided with difficulty and do not lessen the merits of the building; it would be erroneous to refer this idea, on their account, but it would be equally erroneous to [illegible] these faults as being particular refinements, to discover them, and conceive that their explanation was lost to us.

[illegible] these small original irregularities, there are [illegible] other deformations arising later times, and double [illegible] of the most varied kinds. In the course of more than [illegible] years, the building has serve for the most diversified [illegible] and for a Turkish mosque.

The [illegible] ceiling of the opisthodome fell in the year [illegible] a bomb from Morosini's besieging troops fell in the [illegible], in which the Turks had secured their powder, and exploded this, shaking the structure to the foundations and scattering the blocks of marble as far as the [illegible]. Again and further pillaged the triglyph-frieze in [illegible], destroyed the the cornice; the building has to endure a [illegible] bombardment in 1824-1827. The three column [illegible] relatively [illegible] here. The exterior surface of the marble is now [illegible], the edges no longer exhibit any sharp angles or [illegible]; the stylobate has been much crushed by the falling columns of the cornice, especially at the angles, and other blocks [illegible] the columns are in great part overthrown, the separate [illegible]

3.53 ins. (6.83 to 6.54 ft.), and such different forms of echinus are exhibited, also that drops and pieces of mouldings are found cemented in, that the four angle columns are not of equal height etc.

The defects were certainly but very small, and scarcely another building of ashlar masonry in the world, of ancient or modern times, may exhibit as few faults and slight defects in construction as the technically perfected Parthenon, though affected by the imperfections of human powers. Let one but compare in this way the construction of the best structures of the Roman, or even of the Renaissance period. Yet these small faults are avoided with difficulty and do not lessen the worth of the building; it would be erroneous to rate this lower on their account, but it would be equally erroneous to explain these faults as being particular refinements, to discover them, and conceive that their explanation was lost to us.

But besides these small original irregularities, there also occur other deformations arising in later times, and demolitions of the most varied kinds. In the course of more than 2000 years, the building has served for the most dissimilar purposes, for the pagan house of a deity, for a Christian church, and for a Turkish mosque.

The marble ceiling of the opisthodome fell in the year 1403; in 1687 a bomb from Morosini's besieging troops fell in the Parthenon, in which the Turks had stored their powder, and exploded this, shaking the structure to the foundations and scattering the blocks of marble as far as the Museum hill. Elgin and Lusieri pillaged the triglyph-frieze in 1801-1803, destroying the cornice; the building had to endure a violent bombardment in 1826-1827. "The three common onemies of antique art, Turks, Englishmen (?) and gunpowder," have also pretty effectively labored here. The external surface of the marble is now everywhere corroded; in consequence of the occurrences mentioned, the steps no longer exhibit any sharp angles or plane surfaces; the stylobate has been much crushed by the falling stones of the cornice, especially at the angles, and other blocks were moved from their original beds by the force of the powder; the columns are in great part overthrown, the separate drums

of those still remaining upright being twisted from their original beds (Fig. 98), and the cell walls and columns along the sides are overthrown; the architraves are much injured in several places, especially near the angles, the cornices have gaps and are interrupted, and the pediments are but partially preserved. If some portions are still well preserved, with the exception of the everywhere injured external surfaces, the material has resisted the influences of the weather in great part, and the end and bed joints of some blocks are still very close [1], yet an excellent state of preservation of the monument, as frequently asserted, is entirely out of the question.

*Note 1. This is in many places ascribed to incrustation in the joints.*

An attempt at restoration made in 1841-1842 had as its object the reparation of numerous injuries, since with good intentions two entire columns were rebuilt on the north side and others half-way, only the drums of yet others being raised upright, and the northern cell wall was partially rebuilt.

The dissimilar foundations, the various irregularities in construction, the fact that the four angles are not in the s same horizontal plane, the shocks and distortions that the building suffered, the cracks in the architrave, the partial opening of the joints of the ashlars of the stylobate, the jagged projection of some in front of the face line, and the irregular form of the curve, do not permit the assumption of an originally intended construction of the now curved horizontal lines. The condition of the building as described no longer allows it to be determined with certainty, whether certain unusual and peculiar appearances were intended, or existed on it 2343 years ago. Also the difficulty of constructing such curves, and the consequences resulting therefrom for other portions of the architecture, with the actually invisible effect of this, since the ratio of its rise to its length is very small, and it chiefly lies below the horizon on the substructure, and on the architrave is intersected by the abacuses of the c capitals and became quite without effect, these would oppose an intentional arrangement, which would on the other hand be answered by a denial of the difficulties. If the construction

were so easy, why did not the masters of Egyptian sculpture succeed in executing it with regularity? They could not lack a final precisite for a described and not very large building as some satisfied, and the four angles of the structure be placed at the same height; yet if the establishment of a curve was [illegible] by the architect, it must then be seen, that this experiment resulted quite as disagreeably and may be considered as [illegible] but successful. Especially if regarded as disproportionately enormous, and not in accordance with its actual [illegible]

[illegible] 1.16 [illegible], one at the middle of lines respectively 2.5.25 and [illegible] ft. long, whose continuity is further interrupted at the centre by lineated areas for accent. The position of the [illegible] and the subtle execution, with all the small defects [illegible] and which are inherent in the latter, is nevertheless so perfected, that it would be difficult to pass off as [illegible] such as imperfectly and unwaryly expressed arrangement as the present curves, if we were willing to accept [illegible] of the extreme (case), we will allow the lower to rest [illegible] in a higher degree for the essential discussion in the [illegible] since we must likewise accede to obtuses in the arcuate lie [illegible] difference heights or the altitude of the degree at circuit. [illegible] peoples were indeed likewise free from this line of beauty. [illegible]

[illegible] to be described and attacks concentricity for [illegible] in the different dimensions of the lineaments [illegible]

[illegible] perpendicular to the wall wall, these are found for the se- [illegible] domes (which, as previously stated, were not of equal [illegible] their heights frequently differing about 6.56 [illegible] [illegible] relies on the external surface then on that second t

were so easy, why did not the masters of technical skill then succeed in executing it with regularity? Why could not the f first requisite for a detached and not very large building be once satisfied, and the four angles of the structure be placed at the sage height; But if the establishment of a curve was intended by the architect, it must then be said, that this experiment resulted quite too miserably and may be designated as anything but successful, especially if regarded as disproportionately enlarged, and not in accordance with its actual insignificance. For finally, what signifies 3.30 ins. or less than 1.18 ins. rise at the middle of lines respectively 229.66 and 101.72 ft. long, whose continuity is further interrupted at the centre by inserted steps for ascent? The jointing of the stones and the entire execution, with all the small defects described and which are inherent in the latter, is nevertheless so perfected, that it would be difficult to pass off as intentional such an imperfectly and awkwardly expressed arrangement as the present curves, if we were willing to accept them as original. For the honor of the Greeks, and on the basis of the evidence cited, we will allow the former to pass current in a higher degree for the beautiful Theseion in the face of the much discussed curves of the stylobate (Fig. 99), since we must likewise ascribe to changes in the ground the different heights of the stylobate of the Heraion at Olympia, where the execution is certainly less refined. Other Doric temples were indeed likewise free from this line of beauty, "only perceptible by the feelings."

A peculiarity in regard to the original curvature, that still remains to be described and affords opportunity for consideration, as the different dimensions of the lowermost drums of the columns; men are commonly inclined to deduce from the unequal measurements occurring on them conclusions in favor of originality.

Measuring on the surface in a plane passed through the centre perpendicular to the cell wall, there are found for the separate drums (which, as previously stated, were not of equal height, their heights frequently differing about 5.50 ins) greater heights on the external surface than on that toward t

to one side or the other cannot be regarded as intended for a definite purpose. But it must not be forgotten here, that many drums were also displaced by the explosion.

Assuming an intentional curvature of the horizontal lines, the front surfaces of the triglyphs and metopes at the four angles must have angles other than right, yet this is not found to be true on numerous measured pieces. With suca a very flat curve and such a loose connection of the metope slabs, a decision in regard to these angles at the corners would originally have been made with difficulty, since the variations must have been quite minute. Now when the architrave on which rests the triglyph frieze is broken, and the building has suffered much by violent injuries and from decay, nothing certain can any longer be stated concerning this, and positive statements about the angles in question, such as are occasionally made, are to be very cautiously accepted under these conditions.

It must always remain meritorious that Penrose permanently determined the minute differences in measurement and the irregularities on the buildings; but I cannot defend the various optical and esthetical perspective studies and principles, which were deduced from these, and some of which are even ridiculous.[1] The occasional representation of the actual measurements by abstract numbers is only to be regarded as an eccentricity.

*Note 1. Most of these are not based on a survey by the author concerned, but on unlimited faith in the three and four figure measurements of Penrose. I have elsewhere shown in regard to this, that his statements do not in all cases correspond to the actual conditions on the building, and that he represents things as better than they are in reality. I have to add, that many parts, whose dimensions he gives, in general no longer exist on the building and laso could not have been in existence 40 years since. Thus for example, on the west side, the dimensions of the front surfaces of the abacuses of the 1 st, 3 rd, 4 th, 5 th, 7 th and 8 th columns (taken from the north to south) are no longer to be determined, as well as those of the regulas and drops beneath the 5 th, 6 th, 7 th, 8 th, 9 th, 11 th, 13 th and 14 th triglyphs, since these were*

the cell wall; these differences first result from the fact that the pavement of the portico is laid inclined, and they are increased by the inclination of the columns toward the cell wall. But measuring in a plane passed through the centre parallel to the cell wall, differences in measurement are again found on the surfaces of nearly all columns, so that on the pediment ends, for example, the lines on the southern sides have heights differing from those on the northern sides. It is evident that the differences are not great; they lie between the limits of 0.00 and 0.47 inch. Since the larger variations in measurements are mostly near the angles, an appearance might be produced, that it was intended to arrange by the irregularities in this direction an adjustment of the upper surfaces of the drums to the horizontal, and thus render possible a vertical position of the axes of the columns on them. The uppermost adjusting drum would then cause the flatter curve of the architrave.

If one here assumes it to have been the actual and sole intention of the architect of the Parthenon to build with reference to an adjustment of the drums to a horizontal, we must then again declare that he succeeded in this in only a very imperfect way. An earlier drawing even made the divergence of the axes apparent (Theoretically constructed, though never really apparent); the measurements of the drums taken in this direction exhibit the following differences (excluding the angle column). *Only perceptible by delicate measurements.*

| | | | | | | |
|---|---|---|---|---|---|---|
| East side | II | III | IV | V | VI | VII [1] |
| East side | 0.473 | 0.354 | 0.118 | 0.000 | 0.118 | 0.473 ins. |
| West side | 0.394 | 0.197 | 0.079 | 0.197 | 0.275 | 0.275 ins. |

*Note 1. According to the Table, the dimensions of column VI are to be corrected in Fig. 97.*

It would appear scarcely permissible to wish to establish a constant and uniform increase or diminution of the difference numbers to the right and left in favor of a system.

With a diameter of the lower drum of about 6.56 ft., and a with the previously described mode of bedding and setting it on the inclined surface of the pavement, a possible displacement of a few tenths of an inch (in places only 0.079 inch)

that were during the government of [illegible], [illegible]
[illegible] [illegible]
on tiers of the [illegible], [illegible], [illegible] and [illegible].

In the [illegible] [illegible] column (like the [illegible]), the
[illegible] [illegible], the edges of the [illegible] no longer fit on each
other. Hence the column or [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] on the old [illegible], the [illegible] [illegible] [illegible] [illegible]
[illegible] the higher [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] the lower [illegible]. This [illegible] is [illegible] in a [illegible]
[illegible] on the [illegible] of the [illegible] [illegible]: the [illegible] [illegible]
[illegible] and the next one [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible]), as well as the [illegible] and [illegible] [illegible]
[illegible] [illegible].

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
the measurements of the profile of the [illegible] of the [illegible], [illegible]
[illegible] and [illegible] columns of [illegible] [illegible], of the [illegible] [illegible] of
the [illegible], of the [illegible], [illegible], [illegible] [illegible] [illegible]
[illegible], or of the [illegible] [illegible] [illegible]. "

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
a single one has remained in position; in all others the [illegible]
are irregularly distorted (Fig. 100), and [illegible] one of the
[illegible] is in its original position; the [illegible] occurs in a equal-
ly [illegible] [illegible] on the [illegible] [illegible] [illegible] of this [illegible].
What matters under these conditions the very [illegible] [illegible]-
ce on the side surfaces of the columns in the direction of the
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
about the axis of the drum would lessen or increase this for
the drums with [illegible] [illegible].

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
a rule for protection against the effects of earthquakes and
the insecurity of the site, must be abandoned; only when con-
structed in the reverse direction, as in [illegible] [illegible]
masonry, did the curved horizontal lines possess a meaning,
although a rise of 3.15 inches for a span of 1[illegible] ft. is of no
[illegible] value.

A [illegible] demand for the conveyance did not exist, but
it passed to the beauty of effect, one could [illegible] [illegible]
[illegible] [illegible]

*shot away during the bombardment in 1826-1827; likewise those of the 5 th, 6th, 7th, 8th, 10th and 11th metope slabs, as well as those of the 7th, 8th, 9th, 10th and 11th triglyphs.*

*On the southwest angle column (thus the 8th column) of the western pediment, the edges of the flutes no longer fit on each other, hence the column or the different parts thereof are no longer on the old location; the five lowest drums still harmonize; the higher ones indeed harmonize with each other, but differ from the lower ones. This condition is shown in a greater degree by the columns of the eastern front; the northeast column and the next one have strongly displaced drums (see the corresponding Figs.), as well as the 5th and 8th (from north to south).*

*No longer to be determined, since they exist no more, are t the measurements of the fronts of the abacuses of the 3rd, 6th, 7th and 8th columns of this side, of the southeast angle of the architrave, of the 7th, 11th, 14th and 15th regulas and drops, or of the southeast angle triglyph.*

*Of the 13 columns of the southern side of the Theseion, but a single one has remained in position; in all others the drums are irregularly displaced (Fig. 100), and scarcely one of the many is in its original position; the same occurs in an equally striking way on the adjacent pediment end of this temple. What matters under these conditions the very slight differences on the side surfaces of the columns in the direction of the length (of the temple); a single slight twist to right or left about the axis of the drum would lessen or increase this for the drums with diverging beds.*

But to wish to see a structural reason in these curvatures, a rule for protection against the effects of earthquakes and the insecurity of the site, must be abandoned; only when constructed in the reverse direction, as in Egyptian foundation masonry, did the curved horizontal lines possess a meaning, although a rise of 3.15 inches for a span of 105 ft. is of no practical value.

An esthetical demand for the curvature did not exist, but in regard to its beauty of effect, one could hold a different opinion.

Krell [2] holds this opinion in his Geschichte der Dorischen Styls; "Not paralyzed, as some would say, but strengthened by the curved horizontal lines, which were moreover formed in the eye, the beauty of such an effect is questionable and might a also be obtained by a nearer approach to the building."

*Note 2. Geschichte der dorischen Styls etc. Stuttgart.1870.*

If the Greeks also possessed "more uncorrupted" eyes than we do (from the less frequent use of straight-edges, bevels and plumbs !) and saw everything straight as if curved, so that perhaps only curves appeared straight, the curvature was then certainly necessary, when a horizontal straight line was intended.

But if it be proved to us, that all the grace and the eternal youth of Grecian architecture consisted in the distorted horizontal lines, which are moreover only to be recognized on a few monuments, we must then still gratefully reject this dogma.

The statement that the "scamilli impares" of Vitruvius were transferred to the lowest drums of the columns of Grecian Doric temples, according to the explanations, has but a limited value; as repeatedly proved in this case, the divergent beds of the drums are first arranged in accordance with the inclination of the columns inward and with the inclined floor of the portico.

Hoffer [1] believed that a fixed optical law must be accepted for the intended curvature, since he states that every long facade appears lower in accordance therewith, and the more so the longer it is, if one stands before its centre and looks toward both ends.

*Note 1. Hoffer represents himself in his Beitrag zur Konstruktionslehre der Griechischen Tempel (Allg. Bauz. 1838, p. 371, 379, 387) as being the first, who has "given to his contemporaries a clear presentation of the system of construction of the Parthenon." His technical explanations and statements are also mostly acceptable and correct. But his wedge, flying buttress and curve theories afford reason for well grounded hesitation. The evidence, "that the system of curved lines on the Parthenon was actually based on the design and*

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*not on accidents" was not brought forward by him, while he neglects many things, like the architrave destroyed at the angles, the injuries in the substructure, the opening of the joints etc., and the results of the explosion, while he did not take into consideration a sinking of the building, which was or explained as such by him. He further states that the curve in the 3rd and 4th courses from the top of the substructure loses itself, and that only with the upper angle of the uppermost step does "the complete curve of the construction" appear, to which all homologous lines of the entablature are then parallel, which does not occur. For the courses turned inward, found by him, and their purpose, the drawing of the horizontals inward about 0.59 to 0.79 inch, that commences on the capitals and increases up to the last line of the cornice, while the tympanum is again curved back from a true plane, Hoffer can give us no explanation, but these are most quickly accounted for by the deformations that occurred there.*

*According to him, but a few triglyphs stand exactly plumb; the different pieces of the frieze were all fitted against each other at discretion, which was the less to be avoided, since almost every one had a different inclination to the vertical.*

*The deformation in the stylobate, which caused the cracks in the architrave and its changed position, must have likewise changed the position of the triglyphs and of the metopes, set with some play in the grooves.*

*Therefore these are the less suitable for proof, than the higher mutilated cornice. Just as little can the present condition of the pediment induce us to accept, that its upper limiting lines were originally at a slight angle, and were later raised to the correct inclination.*

If this inclination toward both sides were exhibited on the building itself, the effect on the observer must then be increased, since the structure would appear longer to him than it is in reality. Whether the Greeks may have intended to increase the effect of their temples in this way must be left undecided.

Bötticher explains the curvature of the horizontals as hav-

having arisen from the compression of the foundations, built of materials of inferior quality; Hoffer also calls attention to the fact, that on the eastern end (just where it rests on the natural rock and has the least depth of foundations) it has sunk toward the north, and then again raising this sinking, assumes in his communication a regular curve, which is to be regarded as an arc of a circle of 7087.84 ft. radius. He fixes the rise of this arc at 2.49 ins., and that on the Theseion at 0.985 inch.

But this raising of the angle and the regularity of the curve resulting therefrom are arbitrary and a concession to this theory, as he desires to assume and contrive something in its favor, and so provides himself with it, determined in a peculiar way. We are not authorized to make such corrections, concerning what we shall characterize as defects in workmanship, and which are produced by deformations or sinkings.

Hoffer also adds to this and specifies, as did Penrose later, that not all "similar parts of the temple were made entirely alike with painful accuracy, and he even ascertained variations by no means unimportant, which still made no disturbing impression on the general effect." Small defects and irregularities in the construction, with otherwise perfect jointing of the cut blocks, changes in the ground, deformations of violent character by explosion and bombardment, the decay of the upper surfaces, and the adhering together of the joints of the marble, are described by all investigators, and the condition of the monument resulting therefrom justifies the abandonment of the so subtle theory of curvature. At this time, when scarcely an angle of the building is uninjured, anyone would deceive himself, were he willing to fall into enthusiasm over the effect of curves, and to look for them as the elixir of life of Grecian architecture.

The slight negligencies in execution, where the beads are in many places omitted above the triglyphs or metopes, or it was forgotten to carve them in finishing, must be mentioned. But these oversights could be repaired by painting.

A curvature of the stylobate, especially on the sides, is a also noticeable on the unfinished Temple in Egesta, whose stylobate has never been dressed off, and rough pitched surfaces

of very different dimensions appear on all ashlars. It is as readily visible as on the Parthenon, and especially if the north side be viewed under accidental light, so that the vertical surfaces of the steps of the stylobate are in half shade and the horizontal ones are in full sunlight.

R. Koldewey and O. Puchstein remark on this matter, that all lines of the stylobate are "curved" convex, so that the southern stylobate has a rise of 3.15 ins. and the eastern one of 1.58 ins. for the corresponding lengths of 200.63 and 86.05 ft. These are curves that can scarcely be drawn at a small scale--a chord of 200 ft. long with a rise of 0.26 ft.! If the construction be otherwise in good condition, which I am unable to affirm, and the jointing be accurate, it would hardly be possible to seek this curvature as from a later deformation. One need not believe in such, yet he should remember, that the stylobate is unfinished, that a good jointing may also be produced by the cementing together of the stones by rain, that many of the columns are hooped with iron, that architraves hang in iron stirrups, and also that yet other "curvatures" exist on the building. Are the four angles of the Temple also actually at equal heights?

Only if measured from the more deeply cut surfaces of the ashlars supporting the columns and forming the upper step of the stylobate, from the sinkings in which the columns stand, could be obtained any decision upon any courses. Then would it also not be forgotten, that only the stylobate ashlars loaded by the columns are still in place, the intermediate blocks have long since been removed by "stone robbers." The second column on the left of one pediment end is no longer the original one, the capital of the angle column is half broken off; the surface of the stone is eaten away, the drums of the columns are like cheeses and are weathered etc. -- Where is to be found the "faultless" condition of the building? [1]

*Note 1. See the great photographs of the Temple, 19.69 ins. square, that are to be had in the trade, likewise the illustrations and text in the work: "Aus dem klassischen Süden." Lubeck. 1896. Text, p. 50, 51; plates, 113, 114; also Koldewey & puchstein. p. 132-135.*

[illegible] a dispersive communication is made in the work on "Pendulum," which we reproduce verbatim.

Note 1. Abhandlungen von Bunsen, Vol. 3. Das Weltsystem der [illegible]

Finally, another peculiarity which I be mentioned, the deviation of the horizontal lines in the foundation. The southern tower appears to be made entirely level, both the sanctuary yet resting as well as the preparation of the solid rock, small [illegible] to 0.08 inch not being considered, and the construction of the portion facade are too weak broken to permit reasonable conservation. But the western facade is otherwise; the increase in height here continues from both sides to the mid-[illegible] are be indeed uniform in all columns. The maximum of this [illegible] amounts to 0.15 ins. at the centre. That such a regular curve could not have been produced by an accidental sinking is clear. But since the operation is too much disconnected [illegible] I can in course deduce from [illegible] tals."

On this occasion, the swelling of the southern side to [illegible] corners, three of the northern and eastern sides [illegible] to be concerned, and that of the western side is [illegible] construction and consequently therefore [illegible]

[illegible]

[illegible] construction of an inherent curvature of horizontals, and that as little and for similar reasons, as on the Brunsen sun [illegible]. Perhaps in warehouses are here to be considered as proven by the existence of straight and curved structures on the same work, and I cannot forbear to refer it to the well known [illegible]

[illegible] the tower towards the middle, the workmen come out rather too [illegible] at the centre. In setting line courses of masonry, work[illegible] are rather inclined to have the setting sunlight rise, than [illegible] to incline downward. These small deviations for different sub[illegible] are finally added together and occur at the junction of [illegible] middle the excess over a true horizontal. Small variations of 1.97 ins. rise for a horizontal distance of 44.65 to 49.45 ft

An interesting communication is made in the work on Pergamon,[1] which we reproduce verbatim.

*Note 1. Altertümer von Pergamon. Vol. 2. Das Heiligtum der Athena Polias Nikephorus. p. 23. By R. Bohn. Berlin. 1885.*

"Finally, another peculiarity should be mentioned, the curvature of the horizontal lines in the foundation. The southern facade appears to be made entirely level, both the ashlars yet remaining as well as the preparation of the solid rock, small variations up to 0.59 inch not being considered, and the courses of the northern facade are too much broken to permit accurate observations. But the western facade is otherwise; the increase in height here continues from both angles to the middle and is indeed uniform in all courses. The maximum of this rise amounts to 2.16 ins. at the centre. That such a regular curve could not have been produced by an accidental sinking is clear. But since the opposite side is too much disconnected to show anything similar there, I can in nowise deduce from this single observation an intended curvature of the horizontals."

On this building, the substructure of the southern side is entirely horizontal, those of the northern and eastern sides can no longer be determined, and that of the western side is curved; horizontal construction and curvature therefore appear in the same structure.

We prefer to adopt Bohn's views, that it cannot here be a question of an intended curvature of horizontals, and just as little and for similar reasons, as on the Parthenon and Theseion. Defects in workmanship are here to be considered as proved by the existence of straight and curved substructures on the same work, and I cannot forbear to refer it to the well known occurrence in practice, that in setting ashlars from the two ends toward the middle, the workmen come out rather too high at the centre. In setting long courses of ashlars, workmen are rather inclined to have the setting strips rise, than to slope downward. These small additions for different ashlars are finally added together and produce at the junction at the middle the excess over a true horizontal. Small variations of 1.97 ins. rise for a horizontal distance of 42.65 to 98.42 ft.

[illegible]

[illegible] the one temple in Corinth, a convexity was likewise discovered on its western side,[illegible] which for a length of 60.70 ft. it has a rise of 0.75 in. at the centre. A similar one is not evident for the upper side. With this it should be noted, that an earthquake at an early time threw down the temple and disorganized most of the massive columns. At the very least, [illegible] of the last 30 years have indeed not injured the temple, but the stylobate under most of the columns still stands; [illegible] to be so rudely, but a not distant time, the complete overturn of the temple (here already cited be said; of the 7 [illegible] "[illegible] blocks' may be predicted with certainty." [illegible] 1888-189[illegible].

Under these conditions the assumption is scarcely probable, that a dislocation has not occurred here, and that in spite of these primitive conditions, an upward movement may not have displaced the stones and the solid rock by a small amount or have changed their position. But we will for the lowest drop the possibility or defects in workmanship and ask whether the [illegible] buildings to be actually uncomfortable, if it shows or the solid rock may not a striking course, when the lowest step of the temple is out out of the solid rock? [illegible] [illegible], and possibly to see that the [illegible] in [illegible] is [illegible] on the solid rock is it to be accepted, that the two [illegible] [illegible] have been [illegible] [illegible] by the midwives of the [illegible] in the solid rock in consequence of the dislocation of water. [illegible] [illegible] [illegible] [illegible].

Also for the temple of Jupiter in Pergamum, F. Dörpfeld and [illegible]

may well be passed by the superintendent of the work, as assuredly done in Pergamon.

On the old Temple in Corinth, a curvature was likewise discovered on its western side,[3] which for a length of 65.70 ft. h has a rise of 0.79 in. at the centre. A similar one is not s stated for the longer side. With this it should be noted, that an earthquake at an early time threw down the temple and prostrated most of the massive columns. At the very least, 2400 years have elapsed since its erection, and "the earthquakes of the last 50 years have indeed not injured the temple, but the stylobate under most of the columns still standing was found to be so ruined, that a not distant time the complete overthrow of the temple (here should rather be said; of the 7 shafts of columns yet standing with their half fallen and ruined architrave blocks) may be predicted with certainty."

*Note 3. Mitt. d. Kais. Deutsch Arch. Inst. p. 297-308. Athens. 1886-1887.*

Under these conditions the assumption is scarcely probable, that a deformation has not occurred here, and that in spite of these primitive conditions, an unusual accident may not have dislocated the stones and the solid rock by a small amount or have changed their position. But we will for the moment drop the possibility of defects in workmanship and ask whether the discoverer of the curvature really believes the foundation of a building to be actually unchangeable, if it stands on the solid rock? Why may not a sinking occur, when the lowest step of the temple is cut out of the solid rock? Mediaeval and even other architects frequently held the solid rock to be truly unreliable, and exactly to the fact that the Friedrichsbau in Heidelberg is founded on the solid rock is it to be ascribed, that the two principal facades have been considerably separated from each other by the widening of the cracks in the solid rock in consequence of the admission of water.(Thus not at all by suddenly occurring natural accidents).

Also for the Temple of Poseidon in Paestum, R. Koldewey and O. Puchstein [1] remark, that as in Egesta, the surfaces of the stylobate and of the step are not horizontal in direction.

*Note 1. See Die Griechischen Tempel in Unteritalien und Si-*

[illegible]

[illegible] is generally either one inventor, it may be counted among the best on, the course of machine construction, both in a scientific as well as in a purely technical respect. All practitioners are certainly unanimous always with an interest in solve them.

The building has proceeded greatly, it is torn apart at the [illegible] when the weather, yet on the [illegible] may be recognized an observation with the eyes alone. The rise as the centre is [illegible] the heights of the structure at 78.50 and 192.49 ft. The rise are therefore less than in Dresde, it being here also assumed, that the four angles of the stylobate are at the same height.

Here it is at least answered by the observers, that the four corners of the stylobate do not lie in the same horizontal plane. This structure would be really constructed in technical respects, if changes in the "[illegible]" were not assumed, as more probable at the Dresde in [illegible], where the like conditions occur as at the [illegible].

[illegible] considers the matter from an esthetic point of view and emphasizes, when he says that there is not a mathematically straight line on the entire building. [illegible] successions of the same lesting required the omission of the columns and found everywhere in visible mathematics, from to make apparent the pulse-beat of the inner life. That one can [illegible] everywhere without first proving that by measurings [illegible] [illegible] a work also of the proof of their original existence, as it has be assumed, they would their realization in [illegible] the not be free from the objection of [illegible] impossibility, and from this the consequences are protected by the reality of other works, especially on the Parthenon and Theseion. That the application on the Acropolis is or Athens and other works of the Doric style, which do not have the curvature of the horizontals, manifest an equally full pulse-beat of the inner life,

*Sicilien by R. Koldewey and O. Puchstein. Vol. 1. Berlin. 1899, both for Egesta and Paestum. In the work mentioned the material is carefully sifted and treated; it may be counted among the best on the domain of antique architecture, both in a scientific as well as in a purely technical respect. All questions are certainly handled clearly and wisely with an attempt to solve them.*

The building has suffered greatly, it is torn apart at top at both ends, and the eastern facade lies a few inches lower than the western, yet on the facades may be recognized an evident, though not uniform sinking toward the angles, even by observation with the eyes alone. The rise at the centre is given at 0.79 inch on the ends and 1.58 ins. on the sides for the lengths of the structure at 79.20 and 196.46 ft. The rises are therefore less than in Egesta, it being here also assumed, that the four angles of the stylobate are at the same height.

Here it is at least admitted by the observers, that the four courses of the stylobate do not lie in the same horizontal plane. This structure would be badly constructed in technical respects, if changes in the foundations were not assumed, as made probable at the Temple in Priene, where the like conditions occur as at the Parthenon.

Jacob Burckhardt [1] considers the matter from an esthetic point of view and exaggerates, when he says that there is not a single mathematically straight line on the entire building. Expressions of the same feeling required the entasis of the columns and sought everywhere in visible mathematical forms to make apparent the pulse-beat of the inner life. That one now sees curves everywhere without first proving them by measuring instruments, and that they do not exist in feeling alone, this remains a weak side of the proof of their original existence, and if this be assumed, then would their realization in practice not be free from the objection of technical impossibility. But from this the constructors are protected by the quality of other works, especially on the Parthenon and Theseion. That the Erectheion on the Acropolis of Athens and other works of the Ionic style, which do not have the curvature of the horizontals, manifest an equally full pulse-beat of the inner life,

must indeed be without doubt.

[illegible] Das Altertum, 2, 8, Berlin, 1956.

[illegible]

the present condition of the temples considered, and after [illegible] northern, where the stylobate sections were in part moved from [illegible]

this fact is the basis without from many theories, and for anything further, we may easily ourselves by a reference to the worthlessness of horizontal curves to every architect in [illegible].

Note 1. Der optische Massstab etc. 3 rd edition. Berlin, 1924. In reference to structures, also see Burn, 1. Die Pro- [illegible]

In reports on the excavations in Samos Dörpfeld calls attention to the fact, that under two columns of the portico columns of very slight height ([illegible] to 0.30 lns.) were found [illegible] or the columns an inclination inward, but to make the surface

this arrangement did not exist on the nine columns of the Sam- ian portico. But this levelling did not occur here in a pa- ne parallel to the wall of the cell, in the earlier examples referred to Vitruvius, but in one perpendicular to this wall, which was necessary, since the pavement had a fall from the [illegible] of the wall to [illegible] lobbe.

Note 2. Mitt. d. Kais. D. Arch. Inst. Athens. 1904. p. 394-397

The inclination of the pavement of the portico has also been [illegible] demanded. Dörpfeld sees in this arrangement the "scientific im- [illegible] ted by every technician, although Vitruvius places it onto a [illegible] and clearly in the [illegible] the columns.

These were practically the methods of scientific [illegible]

must indeed be without doubt.

*Note 1. Der Cicerone. p. 5. Basle. 1860.*

So much is now assured, and this will also be felt and must be conceded by the friends of intentional curvature, that in the present condition of the temples considered, and after all accidents, that have happened to them, especially at the Parthenon, where the stylobate ashlars were in part moved from their beds, and the drums of the columns were forced outwards, the curves now existing are not at all the original ones. By this fact is the basis withdrawn from many theories, and for anything further, we may satisfy ourselves by a reference to the worthlessness of horizontal curves to every practical architect in Maertens.

*Note 1. Der optische Massstab etc. 3 rd edition. Berlin. 1 1884. In reference to structures, also see Durm, J. Die Propylaen von Athen. Zeit. f. Bild. Kunst. p. 294-296. 1884.*

In reports on the excavations in Sunion [2] Dörpfeld calls attention to the fact, that under two columns of the portico on the stylobate on the northern side, wedge-shaped drums of columns of very slight height (~~1.37~~ 0.20 to 0.00 ins.) were found placed, and which moreover were not employed to give the axes of the columns an inclination inward, but to make the surface of contact of the column and stylobate horizontal. Further, this arrangement did not exist on the nine columns of the southern portico. But this leveling did not occur here in a plane parallel to the wall of the cell, in the manner elsewhere referred to Vitruvius, but in one perpendicular to this wall, which was necessary, since the pavement had a fall from the base of the wall to the face of the uppermost step of the stylobate.

*Note 2. Mitt. d. Kais. D. Arch. Inst. Athens. 1884. p. 324-337.*

The inclination of the pavement of the portico has also been proved elsewhere, and therefore this statement is not to be doubted. Dörpfeld sees in this arrangement the "scamilli impares" of Vitruvius, which interpretation will be readily accepted by every technician, although Vitruvius places it quite d distinctly and clearly in the plane parallel to the line of the columns.

There were practically two methods of equalizing; either the

for a temple in the Ionic style in Messa on two plain supporting columns. He assumes, since it is may have been the case in Priene, that also in Messa the pavement of the portico had no slope, in contrast with Attic buildings.(See on the contrary the final conclusion, where it is certainly stated, that the floor of the portico in Priene is inclined). Since the elevation of the stylobate is now unequal on all its sides, he infers from this fact the front edge of the stylobate must have been "curved," and since these bearing surfaces in a plane through the centres of the columns parallel to the wall of the cell had the

ly to the previously unknown "scarili imperfetti" of Vitruvius. The two slabs supporting a column consists of lower and an upper slabs.

Note 3. Die Antike Bauwerke der Insel Lesbos, Berlin, 1890.

have been a pseudoperipteral structure with 8 x 14 columns; our according to the report of the discovery [1] only the two stone slabs mentioned have been preserved. On these slabs are circular marks of location, not completely preserved for their entire perimeter, which rise to different heights above the paved ground of the slabs, almost flush with the ground, [2] or rise above it 0.06, 0.08, 0.12, 0.15 or in one place 1.05 in. but one finds such appearances everywhere on ancient ruins,

ship, and still more by the effects of the weather. To the circumstance that protected and exposed surfaces occur on the same stone and leave the corresponding marks, we owe the possibility of a reconstruction of so many antique monuments; it

bearing surfaces were wrought on the stylobate ashlars, or the "scamilli impares" were formed on the lower drums of the columns by making their beds divergent. With these "scamilli," the slope of the pavement of the portico and the oblique position of the columns could both be taken into account.

Koldewey [3] prefers to have discovered the "scamilli impares" for a temple in the Ionic style in Messa on two slabs supporting columns. He assumes, since this may have been the case in Priene, that also in Messa the pavement of the portico had no slope, in contrast with Attic buildings.(See on the contrary the final conclusion, where it is definitely stated, that the floor of the portico in Priene is inclined). Since the elevation of the bearing surface above the upper surface of the stylobate is now unequal on all its sides, he infers from this that the front edge of the stylobate must have been "curved," and since these bearing surfaces in a plane through the centres of the columns parallel to the wall of the cell had the maxicum and minimum elevations, they thus corresponded "exactly"to the previously unknown "scamilli impares" of Vitruvius." The two slabs supporting a column comprise an inner and an outer ashlar.

*Note 3. Die Antike Baureste der Insel Lesbos. Berlin. 1890.*

The Temple in question is built of trachyte-tufa and must have been a pseudoperipteral structure with 8 × 14 columns; but according to the report of the discovery [1] only the two stone slabs mentioned have been preserved. On these slabs are circular marks of location, not completely preserved for their entire perimeter, which rise to different heights above the injured ground of the slabs, almost flush with the ground, [2] or rise above it 0.04, 0.08, 0.12, 0.16 or in one place 0.59 in. But one finds such appearances everywhere on antique ruins, which have their natural explanation in the fact, that the places covered by the shafts of the columns were protected, while the adjacent surfaces were injured by visitors, by cleaning, and still more by the effects of the weather. To the c circumstance that protected and exposed surfaces occur on the same stone and leave the corresponding marks, we owe the possibility of a reconstruction of so many antique monuments; it

has concerned so no one until now, to account those such as are visible or conceivable marks of location for the "sounding bases" of Vitruvius.

Note 1. See page 49 of same work.

Note 2. See the correspondingly illustrations in the work mentioned.

The material in the present case moreover is so uncommonly small in proportion to the whole, that it may at least appear [illegible] is [illegible] on this discovery.

In the work on Prizes of the Royal Museum at Berlin in 1906 (p. 50 et seq.), there is stated in the text on the substructure of the Temple of Athena:--

"Not to the insecure foundation but to the numerous cracks and holes permeating the rock beneath is it to be attributed, that the northwest corner of the stylobate has sunk considerably." It is further added, that the surface of the stylobate, like the floor of the portico, is not exactly horizontal, as stated by Thomas, but it is slightly inclined to the exterior on all four sides of the temple, manifestly for the purpose of removing the water. The difference of heights of the front and rear edges of the stylobate amounts to from 0.58 to 0.70 inch, or in one place to even 1.25 ins. Two methods were employed for equalizing the difference in heights; the cutting were sunk in the stylobate place , or the bases of the plinths of the columns were pressed out obliquely. It results from this, that the columns were set vertical and were not inclined toward the wall of the cell, as Vitruvius desired.

The note on page 50 states that the disk-shaped "accentline" observed by Wolkenby on the Temple of Ceres (Ausgrabung der ionischen Bases, p. 34) evidently served for the same purpose.

Above the foundation masonry rises the temple or the other sanctuary buildings with the finest jointing and connection of the ashlars; the stylobate (plinth) as a structure divided into several steps, that separates the house of the deity from the square, rising above this as a monumental second circular pres-

has occurred to no one until now, to accept these more or less visible or conceivable marks of location for the "scamilli impares" of Vitruvius.

*Note 1. See page 49 of same work.*

*Note 3. See the corresponding illustration in the work mentioned.*

The material in the present case moreover is so uncommonly small in proportion to the whole, that it may at least appear very venturesome to base such distinctly expressed conclusions on this discovery.

In the work on Priene of the Royal Museum at Berlin in 1904 (pp. 88 et seq.), there is stated in the text on the substructure of the Temple of Athena:--

"Not to the insecure foundation but to the numerous cracks and holes permeating the rock beneath is it to be attributed, that the northwest corner of the stylobate has sunk considerably." It is further added, that the surface of the stylobate, like the floor of the portico, is not exactly horizontal, as stated by Thomas, but it is slightly inclined to the exterior on all four sides of the temple, manifestly for the purpose of removing the water. The difference of heights of the front and rear edges of the stylobate amounts to from 0.59 to 0.79 inch, or in one place to even 1.26 ins. Two methods were employed for equalizing the difference in heights; the plinths were sunk in the stylobate slabs , or the beds of the plinths of the columns were dressed off obliquely. It results from this, that the columns were set vertical and were not inclined toward the wall of the cell, as Vitruvius desired.

The note on page 89 states that the disk-shaped "scamilles" observed by Koldewey on the Temple of Messa (Baureste der Insel Lesbos, p. 54) evidently served for the same purpose.

Above the foundation masonry rises the temple or the other public buildings with the finest jointing and coursing of the ashlars; the stylobate (plinth) as a structure divided into several steps, that separates the house of the deity from the earth, rising above this as a monumental sacred offering presented to the god. It serves as a pedestal for the columns and the cell walls. A technical procedure, that prepares for the

open-jointers and leads to it. According to the order in which they reigned, the abaci sometimes exhibit the simple rectangular form of cross section, sometimes a richer recession ed toward the front edge for carrying off the rain. The number of steps varies and keeps within the limits of 1, e, 3 to 4 (Hecaeon in Athens, Heraion in Olympia and Tempio or Zeus in Argos etc. etc.); thus it is not always the same, owing to whether attention was to be paid to an ancient ground or not. They were frequently not recessed as steps for according on account of their great height, from 13.17 to 25.20 mm. T

[illegible]

[illegible] tem, or by steps out in the stylobate or intermediate [illegible] (Ang. 103).

The uppermost step served as a base for the column, whereby this came to stand on one block (Thesaion, Propylaion in Eleusis) or on two, which were then joined under the centre of the column (Parthenon). Between the steps of the stylobates of the Thesaion were employed long stone plates, abutting upon the centres of the columns.

[illegible] tal cramps is usually excluded, though not without exceptions. (Parthenon).

If he has be correct in his publication [1] on the Temple of Artemis Leucophryne at Magnesia, then were the architraves of the stylobate joined in length and breadth by double coverstrip and Kreuzcramps, but not in their height.

Note 1. Le bas. Voyage archaeologique en Grece et en Asie Mineure, Paris, [illegible] Griechenland (1788 and 1804), where the building is not [illegible] mentioned; I merely cannot decide.

[illegible] Choisseul [2] desires to reconstruct from two numerous traces in the Temple in Eleusis, "that the outer blocks of the architrave (intercolumniation of one end were secured by uncovered cramps against what? Against slipping on account of the overhanging or projecting? As drawn, the cramps took hold between the ends of two architraves, like the dowells above and below in the world architraves of the architrave. Passing in with lead the dowells and

superstructure and leads to it. According to the order to which they belong, the steps sometimes exhibit the simple rectangular form of cross section, sometimes a richer recession at the front surface. The upper surfaces are slightly inclined toward the front edge for carrying off the rain. The number of steps varies and keeps within the limits of 1, 2, 3 to 6 (Theseion in Athens, Heraion in Olympia and Temple of Zeus in Akragas etc. etc.), thus it is not always the same, owing to whether attention was to be paid to the adjacent ground or not. They were frequently not regarded as steps for ascending, on account of their great height, from 14.17 to 23.62 ins. T The ascent occurred either by ramps or by special steps placed before them, or by steps cut in the stylobate or intermediate steps thereon.(Fig. 102).

The uppermost step served as a base for the column, whereby this came to stand on one block (Theseion, Propyleion in Athens) or on two, which were then jointed under the centre of the column.(Parthenon). Between the antes of the opisthodome of the Theseion were employed long stone slabs, abutting under the c centres of the columns.

A direct connection of the stylobate ashlars by wooden or metal cramps is usually excluded, though not without exceptions. (Pergamon).

If Le Bas be correct in his publication [1] on the Temple of Artemis Laphria at Messene, then were the ashlars of the stylobate joined in length and breadth by double dovetails and Z-cramps, but not in their height.

*Note 1. Le Bas. Voyage archaeologique en Grece et en Asie mineure. Paris. 1848. Palte 2.(Without text).; Also Baedeker's Griechenland (1888 and 1904),where the building is but briefly mentioned; I myself cannot decide.*

O.Puchstein [2] desires to recognize from two uncovered traces at the Temple in Egesta, "that the outer blocks of the angle intercolumniation of one end were secured by anchored dowells." Against what? Against slipping on account of the curvature or wherefore? As drawn, the cramps took hold between the ends of two ashlars, like the dowells above and below in the solid substance of the ashlars. Casting in with lead the dowells and

ceasing time answered could only be possible, if the joint surfaces had no adhesion; wherefore I could not satisfactorily account for perpendicular vinita, may the drawings of G. Kolderey and G. Egger-Sterr, as well as those of G. J. Hubert, do not give an explanation of this. If then the cowries were exactly on the centre of the lower stone, then it might enter the two placed above, or if it was oversize only, it then entered only one stone; but in both cases it obstructed the security of the sanitare from the front and from the side, and as elsewhere with cowrie. t those would only be lowered to their places from above.

Note 2. Page 44. Plate 114.

As it may follow from this, that "since the central channel (in the centre of the stone is therefore no channel) is always toward the copper, then rest it be assumed, that the blocks were successively set from the middle of the side toward the angles? -- is hard to understand and contradicts by this assumption all similar models discovered.

In the stylobate of the Altar at Pergamon (III, 1, p. 16-17), the rise of the stone is from 3.41 to 2.36 ins., the treads are from 13.32 to 16.14 ins., their edges which being from 12.10 to 24.20 ins. Here is proven by the tracks the direct connection of all stone by cramps at the sides, for others only at the back, and again for yet others by cowrie in the middle.

In the great pyramidal stylobate of the Mausoleum at Halicarnassus, the stone were made immovable directly and indirectly, by interlocking the stones to be connected and by iron cramps with ends bent downward.(see Fig. 104, after the original in the British Museum. Also see C. T. Newton's history of discoveries at Halicarnassus etc. London. 1862. -- Where cramp holes are given, but no cramps).

The steps at the Parthenon and Theseion only overlap each other a few inches, i.e., 2.44 and 3.81 ins., while again on other structures, they overlap nearly as much as they project. The upperness layer is divided into three zones by columns and these free from all pressure and merely inserted. The latter were then only set after the building was completed and the scaffolding removed (see Lemoie at Rheims), in order to protect

cramps thus arranged would only be possible, if the joint surfaces had no anathyrsis; wherefore I could not satisfy myself by repeated visits, why the drawings of R. Koldewey and O. Puchstein, as well as those of J. J. Hittorf, do not give an explanation of this. If then the dowells were exactly an the centre of the lower stone, then it might enter the two placed above, or if it was outside this, it then entered only one stone; but in both cases it obstructed the setting of the ashlars from t the front and from the side, and as elsewhere with dowells, t these could only be lowered to their places from above.

*Note 2. Page 34. Plate 118.*

As it may follow from this, that "since the casting channel (in the centre of the stone is therefore no channel!) is always toward the corner, then must it be assumed, that the blocks were successively set from the middle of the side toward the angles;" -- is hard to understand and contradicts by this assumption all similar methods discovered.

On the stylobate of the Altar at Pergamon (III, I, p. 15-17), the rise of the steps is from 8.41 to 9.06 ins., the treads a are from 15.36 to 16.14 ins., their entire width being from 18.50 to 24.80 ins. Here is proved by the facts the direct connection of all steps by cramps at the sides, for others only at the back, and again for yet others by dowells in the height.

At the great pyramidal stylobate of the Mausoleum at Halicarnassus, the steps were made immovable directly and indirectly, by interlocking the stones to be connected and by iron cramps with ends bent downward.(See Fig. 104, after the original in the British Museum. Also see C. T. Newton's History of Discoveries at Halicarnassus etc. London. 1862. -- Where cramp holes are given, but no cramps).

The steps at the Parthenon and Theseion only overlap each other a few inches, 1.18, 4.33 and 5.91 ins., while again on other structures, they overlap nearly as much as they project. The uppermost layer is divided into those loaded by columns and those free from all pressure and merely inserted. The latter were then only set after the building was completed and the scaffolding removed (see Temple at Egesta), in order to protect

s e ooura fro tnbpre. Inserted stress (zero bicoxa) would in
ales become in height different from the adjacent loaded columns.
So this mode of setting the stones and to the strict contrast
of the courses together is indeed due the deformation of the
substructures of many Greeian temples. Likewise at excavati-
many conqueros-ne, for example at the greater exploration in the
t on. While the transmitted bicoxa were all forced outward from
the.

At the end sur.zoos, the stones only touch each other on the
[illegible] over a measured joint 0.35 to 3.10 ins. Wade, while
the central portion is recessed (fig. 106; Hesseier, Pritchenen,
Tole of Hesseier it Pressed): only thus was it possible to
produce the magnificent joints exhibited by the senior masonry
of Greeian normerts. They are not otherwise connected toeeth-
er by special arrangements. The provision in Athens, the lem-
ons in Sicily and the temple of Zeus in Baestum, neither,
of which was entirely completed, seen the surfaces of the ita-
ered and the rounded steps but partially wrought, varies 1.07
and 3.76 ins. side outlines are completed form, while the up-
per portion proceeds 0.12 to 0.16 inch beyond them and is on-
ly pointed. On these partially worked surfaces, the columns
of the Propylaion at Athens are set by sinking a circle of a
smaller area to the true level, and this is very carefully rub-
bed down; in order that the rain water may not stand thereon,
small channels are incised and extend to the outer edge. The
final dressing of the remaining portion of the stylobate was
left until a later time.

The never completed temple in Egesta exhibits similar contri-
vances for protecting the angles and surfaces from injury sua-
ffered through, tools, or drawing stone spalls, which must have
[illegible]
wise. To make the setting of the drum of the columns possi-
ble, the supporting bicoxa beneath the columns have received
on the upper outer surface a circular sinking, carefully wor-
ked true, which had a diameter about 3.96 ins. greater than
that of the column, and a depth of about 1.18 ins. The trans

the edges from injury. Inserted steps (step blocks) would in time become in height different from the adjacent loaded blocks. To this mode of setting the stones and to the slight bonding of the courses together is indeed due the deformation of the substructures of many Grecian temples. Likewise at extraordinary occurrences, for example at the powder explosion in the Parthenon, the loaded blocks largely remained in correct position, while the inserted blocks were all forced outward from their original positions, frequently 0.47 inch or more out of line.

At the end surfaces, the stones only touch each other on the margins over a marginal joint 2.36 to 3.15 ins. wide, while the central portion is recessed (Fig. 105; Theseion, Parthenon, Temple of Poseidon in Paestum); only thus was it possible to produce the magnificent joints exhibited by the ashlar masonry of Grecian monuments. They are not otherwise connected together by special arrangements. The Propyleion in Athens, the Temple in Egesta and the Temple of Poseidon in Paestum, neither of which was entirely completed, show the surfaces of the inserted and the bonded steps but partially wrought, drafts 1.97 and 2.76 ins. wide outline the completed form, while the upper portion projects 0.12 to 0.18 inch beyond them and is only pointed. On these partially worked surfaces, the columns of the Propyleion at Athens are set by sinking a circle or a square area to the true level, and this is very carefully rubbed down; in order that the rain water may not stand therein, small channels are incised and extend to the outer edge. The final dressing of the remaining portion of the stylobate was left until a later time.

The never completed Temple in Egesta exhibits similar contrivances for protecting the angles and surfaces from falling scaffold timbers, tools, or dropping stone spalls, which must have been produced in finishing the columns and the surfaces of the walls. To make the setting of the drums of the columns possible, the supporting blocks beneath the columns here received on the roughed upper surface a circular sinking, carefully worked true, which had a diameter about 3.54 ins. greater than that of the column, and a depth of about 1.18 ins. The drums

[illegible] were dressed off the external surface of the d[illegible] course (fig. 100) and 0.27 to 1.15 or 1.27 ins. from the axilla[illegible] of the hypotenuse.

Adjoining the pronaos step of the substructure were the f[illegible] floor slabs of the portico of peripteral structure, and for [illegible] terminating at the top the substructure. Constructed of square or rectangular slabs of limestone 7.27 to 9.45 ins. thick, this was dressed with a slight inclination for the removal of rain and waste water, like the upper step of the stylobate [illegible] interconnected walls, or directly on the compacted foundation and [illegible] its concrete layer. The inclination in the portico of the [illegible] amounted to 0.45 inch for a width of 10.50 feet.

The floor of the Temple of Poseidon at Paestum is executed in a composite way; raised courses of marble 7.55 ft. wide, serve as supports for the inner columns; adjoining these are slabs of limestone 1.35 ft. wide and 7.55 ft. wide, [illegible] surfaces which at least the wall and forming the floors of the side aisles; a row of slabs are laid in the centre aisle, [illegible] floors of the side aisles, and the adjacent ones being less [illegible] one present form of the floor of the middle aisle has likewise been produced by sinking it.

The Temple of Zeus at Olympia forms an exception in the floor of the pronaos; the simple pavement of slabs is accompanied and given way to the magnificent mosaic, made of pebbles from the [illegible] fillings surrounded by pale [illegible], the [illegible] [illegible] being processed and separated by [illegible] patterns, discovered and polished by [illegible]. According to Pausanias, the portion of the floor immediately before the image of the deity was not laid with marble, but with black [illegible]; a raised co-

were set in these sinkings, after a margin 2.55 ins. wide had been cut on them with the required diameter of the column.0.97 inch was afterwards dressed off the external surface of the d drums (Fig. 106) and 0.97 to 1.18 or 1.57 ins. from the surface of the stylobate.

Adjoining the uppermost step of the substructure were the f floor slabs of the portico of peripteral structures, and for those without columns, it extended to the interior, thus properly terminating at its top the substructure. Constructed of square or rectangular slabs of limestone 7.87 to 9.45 ins. thick, this was dressed with a slight inclination for the removal of rain and waste water, like the upper step of the stylobate; these were either bedded on separate masonry piers or intersecting walls, or directly on the coursed foundation and forming its covering layer. The inclination in the portico of the Parthenon amounted to 0.46 inch for a width of 15.29 feet.

The floor of the Temple of Poseidon at Paestum is executed in a peculiar way; raised courses of ashlars 5.25 ft. wide serve as supports for the inner columns; adjoining these are slabs of limestone 1.54 ft. thick and 7.68 ft. wide, their upper surfaces sunken next the wall and forming the floors of the side aisles; 3 rows of slabs are laid in the centre aisle, the middle one being horizontal and sunk to the level of the floors of the side aisles, and the adjacent ones being laid inclined to it.(Fig. 107). From which it may be assumed, that the present form of the floor of the middle aisle has likewise been produced by sinking it.

The Temple of Zeus at Olympia forms an exception in the floor of its pronaos; the simple pavement of slabs is abandoned and gives way to the magnificent mosaic, made of pebbles from the Alpheios (tritons surrounded by palm ornaments, the individual panels being bordered and separated by fret patterns), discovered and published by Abel Blouet. According to Pausanias, the portion of the floor immediately before the statue of the deity was not laid with marble, but with black ashlars; a raised border of Parian marble surrounded the black panel in a circle, so as to prevent the oil from flowing away.

Olive oil was here poured upon the ivory, so that it might

not be injured by the marshy location of the Altis; water was used instead of oil for the chryselephantine statue in the Parthenon; the statue in the Temple of Epidauros stood over a fountain, so as to make this saturation unnecessary, the last statement of Pausanias was not corroborated by the excavations.

The floor of the portico was composed of small river pebbles set on edge in mortar, then covered by a coating of smooth stucco mortar, while the side aisles in the interior had a coating 1.57 ins. thick on a basis of stone slabs. The remains of a marble facing in different colors at the entrance side belongs to the Roman period. (Also see the German work on Olympia).

Plastered and colored pavements are also found in smaller t temples in other places, as for example, floors of red stucco on a bed of limestone slabs at Egina; the plastered Sicilian temples must have had similar floors of colored stucco.

Walls enclose the sacred apartment, where statues of the deity and gifts were placed, secluding these from profane eyes and affording to art works protection from weather and from t theft. A consecrated interior was surrounded by them, richly ornamented architurally and decoratively, and it was enclosed above by a protecting ceiling. In accordance with its developed purpose, this was externally treated plainly and without ornament, either constructed of limestone ashlars with a coating of stucco, or of marble ashlars with the most careful jointing, the joints being almost invisible, and internally decorated by paintings. [1]

*Note 1. As stated in the Introduction, unburnt bricks were also employed instead of monumental ashlar masonry in the oldest temples, as well as later on account of lack of means, probably in the manner described for the walls in Troy. The Heraion in Olympia should be included here.*

Being vertical and"subject to the general law of proportional development", the walls consist of a broad base projecting beyond the foundation, of the wall proper, and of a crowning cornice or slightly projecting terminal member, on which rest the ceiling beams. The proportion of thickness to height in most cases varies from 1 to 9 to 1 to 10, or 1 to 10.5, while the height goes from 2 to 2.5 times into the free length, or

the longest free portion between transverse walls; hence there results from this always a great, or at least an average stability of the walls.[2]

*Note 2. See Rondelet. Traite theoretique et pratique de l' art de batir. Paris. 1856. p. 2-17.*

If in the masonry of retaining walls, the strength and character of the masonry are made prominent by the coursing, batter, buttresses, and the rough visible surfaces of the individual ashlars, these ideas decidedly recede into the background in the aspiring walls of the cell, free on both sides. The walls are battering inside as well as outside, though not in all cases in a perceptible manner; Egyptian tradition required a considerable batter on the exterior of the walls of the structure, but it scarcely occurs here. The same feeling that desired the columns to be diminished upwards, must have likewise prescribed a corresponding diminution in the thickness of the walls. The most apparent reason for the construction of walls increasing in thickness downwards was indeed in Egypt, as everywhere, the greater durability, solidity and stability of masonry arranged in that manner. The particular motive of the primitive dykes of the Nile was not required for this, as frequently assumed; men usually soon observed that a body stands the more firmly, the broader its base. The probability of its better preservation was indeed the cause of the careful dressing of the external surface, exposed to the wind and weather.

The base of the wall mostly consists of one or two low plinths projectinm beyond each other,(0.98 to 1.48 ft. high), or sometimes more, sometimes fewer (Parthenon 2, Egina 2, Phigaleia 1), the lower one of these usually having the least height (as likewise frequently occurs on the stylobate), or of a richly moulded base with plinth, cyma and band, as on the Theseion, these members then being returned around the ends of the wall (antes), for which they become formal pier bases (Fig. 108).

Above the base or plinth course as a characteristic rises a double band course (orthostate), according to the magnitude of the building, 2.62 to 4.66 ft. high, that projects 0.31 to 0.39 inch from the true plane of the enclosing wall, These slabs are of equal or unequal heights (See Paestum, the Heraion and the Temple of Zeus in Olympia, the Tholos in Delphi, the Ionic

temple on the theatre terrace at Pergamon, and the corresponding Figs. 109, 110, 111, 113 and 115) and touch only on the joint surfaces in narrow borders (anathyrose). Their heights are in proportion to their lengths as 1 : 2 up to 1 : 2.6 . (Parthenon, Theseion).

On the colossal Temple of Zeus at Akragas, that also presents other riddles, the upper masonry rests on a high plinth with intermediate ogee course, that are together treated as a base for the half columns of the pseudoperipteral structure. Above this commences in courses of equal heights -- without orthostate -- the ashlar masonry of the walls, the isodomum of Vitruvius, executed in bonding and with the finest jointing.(Fig. 112).

The courses are of uniform height up to the corniceand exhibit on the external surface a ratio of 1 and of 2.4 of height to length. Headers and stretchers, the latter not touching each other in the middle of the wall, alternate in the courses; mortar is not used, but a sufficient connection is obtained by means of pieces of iron set in lead. Small iron dowells c connectethe stones vertically and thus prevent the removal of one stone from above another, and iron I-shaped cramps connect them lengthwise (Figs. 11, 116, 117); thus preventing the slipping of the stones; Their contact on the end and bed suffaces is only on borders 2.36 to 3.14 ins. wide (anathyrosis). Not only marble ashlars, but even the common limestone ashlars (see Egina) were dressed and connected together in the same careful manner. Behind the dowells are usually found small holes, the so-called "bar holes,"cut in the upper bed, in which the crowbar was inserted to slide the ashlars together.(See Parthenon, Heraion at Olympia, and the Mitt. d. Kais. D. Arch. Inst. Athens. Abt. 1881. Pl. 12). Bronze was never used as a common material for cramps here; belief in its presence has unfnrtunately aroused the avarice of men in but too many cases, and has contributed to the destruction of many monuments. Even on Attic soil may be seen the criminal traces, the cutting away of columns and ashlars at bed and end joints, scarcely any monument whatever being free from these trial holes!

On the Heraion, and also in part on the Temple of Zeus in Olympia, the base slabs (orthostate) of the wall are arranged

on the exterior alone, while the courses in the nave [illegible] courses of sabiers 2.68 ft. thick. On the opisthodome (rear-east cella of the Temple of Zeus, the side walls are composed [illegible] laid and together 4.58 ft. thick with a height of 5.74 ft(Fig. 111). The slabs in the cell wall are 8.88 ft. long, 3.80 ft. [illegible] 2.48 ft. thick and 1.87 ft. high. While in the temple of Zeus, the sabiers are indirectly connected by iron cramps, which pl- [illegible] of the substructure, the dressed sabiers of the Hepaion are joined together without any connecting material, and the blocks do not touch on borders but in sharp angles, induced by [illegible] the end joints of the sabiers. This kind of joining and dressing is the clear. "

[illegible] thick see further constructed during the Hellenistic period in Sijyon ; being indeed built of limestone sabiers with smoothly dressed surfaces, where a course of headers alternates with two courses of stretchers in header.

Note 1. See Altenburg & Petersen. Stadte Kampylitens und Pr- [illegible]

[illegible] cell walls are built hollow (fig. 114), by courses of headers and lavish use of dowells and cramps, made just as stable as a solid construction.

At the Ptolemaion on Samothrace, courses of headers and stretchers alternate in height and show a connection by iron [illegible] L-cramps are employed instead of I-cramps.[2]

[illegible]

The exclusive use of iron for binding walls at the Thesaion, the little Temple of Nike, the Olympeion and the Ferrenon in Athens, at the Temple of Zeus and the Metroon in Olympia, the

on the exterior alone, while the courses in the interior are constructed with low ashlars. The ashlars then have, for example on the Heraion, a thickness of 1.22 ft. and a length of 7.38 ft. with a height of 3.41 ft., which corresponds to four courses of ashlars 2.63 ft. thick. On the opisthodome (northwest angle of the Temple of Zeus, the side walls are composed of two courses of slabs connected by iron I-cramps set in cast lead and together 4.59 ft. thick with a height of 5.73 ft(Fig. 111). The slabs in the cell wall are 8.38 ft. long, 2.20 ft. thick and 5.73 ft. high, corresponding to courses of ashlars 2.46 ft. thick and 1.97 ft. high. While in the Temple of Zeus, the ashlars are indirectly connected by iron cramps, which also occurs on the Metroon, and indeed already in the masonry of the substructure, the dressed ashlars of the Heraion are joined together without any connecting material, and the blocks do not touch on borders but in sharp angles, produced by undercutting the end joints of the ashlars. This kind of jointing and dressing is the older.

Also without the use of iron cramps, a temple wall 2.10 ft. thick was further constructed during the Hellenistic period in Sillyon [1], being indeed built of limestone ashlars with smoothly dressed surfaces, where a course of headers alternates with two courses of stretchers in height.

*Note 1. See Niemann & Petersen. Städte Pamphyliens und Pisidiens. Vienna. 1890. Vol. 1. p. 77.*

On the Ionic Temple on the theatre terrace at Pergamon, the cell walls are built hollow (Fig. 114), bu courses of headers and lavish use of dowells and cramps, made just as stable as a solid construction.

At the Ptolemaion on Samothrace, courses of headers and stretchers alternate in height and show a connection by iron cramps, similar to that of the Attic monuments, excepting that U-cramps are employed instead of I-cramps.[2]

*Note 2. See Conze, Hauser & Benndorf. Neue archeaologische Untersuchungen auf Samothrace. Vol. 2. P. 39. Vienna. 1880.*

The exclusive use of iron for bonding walls at the Theseion, the little Temple of Nike, the Olympeion and the Parthenon in Athens, at the Temple of Zeusand the Metroon in Olympia, the

vestles on Paros, in Sparta and Ephesus, the Temple of Poseidon at Sounion, are variety in Athens, the Propylaion in Eleusis and Olympia, Argos(?) and Delphi, Athens, etc. has already been pointed out. The use of wooden double cramps was likewise widely.

Besides the L-shaped cramps, four of a small size as cross ends, these projections then being set vertical or horizontal, and I-shaped cramps, as well as square pins and dowells, K-shaped and Z-shaped cramps are found, though rarely. Bronze found or Sanctuarce, besides iron cramps, bronze joggles in last lead and also lead cases from 2.75 to 3.15 lbs. high, 1.57 lbs. wide and 0.59 inch thick.[1] Small bronze cramps of M-shape also occurred in Sicily; in Sanctuaros were found bronze dowells of the dimensions and form illustrated in Fig. 118; the metallic double dovetails with pins and set in lead on bases and Sanctuarce are worthy of mention.

Note 1. Same work. p. 70. 71.

In the Sanctuaria Samos VI Samos, are also preserved bronze dowells set in lead; it is worthy that lead nonsuch and iron dowells set in lead cases as well as I-cramps.(Fig. 118). "

Some by mechanical devices for fastening the iron from small ornaments of stone (for example, drops on mutules), as well as in Sanctuarce in Samos, Cyrene, and other places.(Fig. 118).

The iron I-cramps in Olympia have a length of 0.49 to 52.5 inch, according to the thickness of the blocks or blocks, with a wave section of 0.98 inch high, with a wave section of 0.98 inch high. Small lead dowells like Mr. Fiesel were also found in Olympia. Small pieces may also be seen in some marble cornices in the Acropolis Museum at Athens.

Hence, respect upon hypothesis as the connecting elements for monumental structures in the later time, in the form of dowells and cramps, the latter in dimensions or to 3.10 ft. (See Fig. 118, shows five dowells of Sanctuary Pergamon Museum at Berlin).

Stone and its sequence are such in which the lead cases by stone plinths are well preserved. Bronze dowells, see both Sicilian and Samos VIII Sanctuary.

Temples on Egina, in Sardis and Ephesus, the Temple of Poseidon in Paestum, the Temples in Selinus, the Propyleions in Athens and Eleusis, Hadrian's Gate and the Market Gate in Athens, etc. has already been pointed out. The use of wooden double dovetails was likewise mentioned.

Besides the U-shaped cramps, bent at a right angle at both ends, these projections then being set vertical or horizontal, and I-shaped cramps, as well as square pins and dowells, N-shaped and Z-shaped cramps are found, though rarely. Hauser found on Samothrace, besides iron cramps, bronze joggles in last lead and also lead cases from 2.75 to 3.15 ins. high, 1.57 ins. wide and 0.59 inch thick.[1] Small bronze cramps of N-shape also occurred in Sicily; in Epidauros were found bronze dowells of the dimensions and form illustrated in Fig. 118; the metallic double double dovetails with pins and set in lead on Lesbos and Samothrace are worthy of mention.

*Note 1. Same work. p. 70, 71.*

In the Acropolis Museum of Athens are also preserved in architectural fragments of poros stone lead dovetails and iron dowells set in lead cases as well as I-champs.(Fig. 118).

Lead was by preference employed for patching and for fixing small ornaments of stone (for example, drops on mutules), as repeatedly shown by examples in Athens, Olympia, and other places.(Fig. 118).

The iron I-cramps in Olympia have a length of 9.49 to 28.6 ins., according to the dimensions of the blocks of stone to be cramped together, with a cross section up to 0.98 inch high and 0.59 inch thick. Small round bronze pins for fixing added pieces may also be seen in some marble cornices in the Acropolis Museum at Athens.

Bronze reappears more prominently as the connecting material for monumental structures in the later time, in the form of d dowells and cramps, the latter in dimensions uptto 2.10 ft. (See Fig. 119, pieces from Temple at Baalbec, now in Pergamon Museum at Berlin).

Of special value for determining the procedure in setting stone and its sequence are such in which the lead casts by casting channels are still preserved. Bronze dowells, one half

prismatic and half cylindrical, enclosed in bronze cases still exist in the original pieces, as well as bronze dovetail cramps with little clips. At the so-called Basilica in Paestum are shown together dovetail (double axe-shaped cramps), U-shaped and ornamented cramps at the angles of the stylobate (Fig. 103). In Delphi were employed 40 to 51 large iron H-cramps set in cast lead, in Miletus were found prismatic wooden dowells in cast lead, original specimens of which are preserved in the Louvre Museum in Paris (see Fig. 119), in which the distinction is made by the inscription:--"Bronze fastenings of columns and wooden fastenings of the walls of the cell.

The form of cramp can scarcely be utilized for determining the age of the buildings. Wooden dovetails with carved royal cartouches were found in Abydos and elsewhere. The Egyptian precursor was followed by the Grecian, and in it doubtless appears the most ancient form of cramp; it would be a criterion of the high antiquity of buildings, if it did not recur in those certainly dated later. Anchored iron dowells, cramps and pins were found together in Egesta.(Fig. 103).

The cornice member, that crowns and finishes the cell wall at top, usually consists of a rather low band projecting but slightly from the face of the wall, and which is decorated by a fret pattern and terminated above by an ogee cyma. When the originally solid end wall was changed into antes or a complete colonnade, another mode of treating this portion was introduced, the form of the cornice of the portico or an allied form being transferred to it, the simpler cornice being used for the former partition wall, which was then the wall containing the doorway. The architrave fillet could then be introduced for a richer effect, cutting off a plain frieze with the band, as in the opisthodome of the Parthenon.

The dressing of the external surfaces of the ashlars was only done after they were set in the building itself. The internal and external walls of the portico for the guard, as well as a part of the gateway walls of the Propyleion in Athens, are still unfinished; drafts 7.87 ins. wide are carried around them above, below, and on their sides, and indicate the plane down to which the surfaces were to be worked; the ash-

sections of the external wall still frequently retain the bea-
ds or cavetto, or some [illegible] Tradition
of square proportion, whose sides are from 5.90 to 7.87 inches
square at the base, and their projection is 3.94 ins. or more.
The most interesting example in this respect continues to be
the never completed Temple in Paestum.(Posseate).

The columns in the [illegible] in Abbe [illegible]
the so-called Temple of Poseidon in Paestum, but are somewhat
inclined toward the wall of the cell, and the angle column in
the direction of the line bisecting the angle of the stylobate.
The inclination is very slight, but is plainly visible to an
eye skilled by practice. The inclined wall has the inclined
column as a [illegible].

It may have been critical but not structural reasons, that
required the slightly oblique position; the diminution of
the column, the [illegible] in the [illegible] and [illegible]
ldiature as opposed to the stylobate already gives to the
[illegible] in [illegible] [illegible] [illegible]
or [illegible] conditions, [illegible] [illegible] [illegible]
[illegible] of the [illegible] of the [illegible] [illegible]
thick and massive form of the free supports, this has no im-
portance for [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] law was evidently followed in this, which certainly
[illegible] [illegible] [illegible] [illegible]
also perhaps desired to lessen in the portico the difference
of the two adjoining surfaces, of the wall of the cell and of
the column. (Compare Parthenon, Theseion and Propylaion in A-
thens, Temple of Poseidon in Paestum).

The building [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
the curve are of different heights, varying in dimension [illegible]
[illegible] [illegible] [illegible] [illegible]
proved on this temple. The same was likewise observed at the
[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] of Attica and on the Temple of Poseidon, but were rejec-
ted in Sicily and at other places. They are not generally ap-

ashlars of the external wall still frequently retain the bosses for setting, or rather guide-marks for the work, frustums of square pyramids, whose sides are from 5.90 to 7.87 inches square at the base, and their projection is 8.94 ins. or more. The most interesting example in this respect continues to be the never completed Temple in Egesta.(Segeste).

The columns do not stand vertical in Attic monuments and on the so-called Temple of Poseidon in Paestum, but are somewhat inclined toward the wall of the cell, and the angle column in the direction of the line bisecting the angle of the stylobate. The inclination is very slight, but is plainly visible to an eye skilled by practice. The inclined wall has the inclined column as a result.

It may have been optical but not structural reasons, that required the slightly oblique position; the diminution of the column, the receding of the length and breadth of the entablature as opposed to the stylobate already gives to the structure in a very realistically expressed way the character of pyramidal aspiration, so that it did not need the extremely slight addition of the inclination of the columns; with the thick and massive form of the free supports, this has no importance for any structural purpose. An ancient Egyptian architectural law was evidently followed in this, which certainly no longer had much meaning in this weakened form; but it was also perhaps desired to lessen in the portico the divergence of the two enclosing surfaces, of the wall of the cell and of the column. (Compare Parthenon, Theseion and Propyleion in Athens, Temple of Poseidon in Paestum).

The inclined position of the columns was effected in execution by the insertion of drums with diverging beds between those with parallel beds.(Fig. 121). On the Temple in Egesta, the drums are of different heights, varying in dimensions between 3.05 and 4.13 ft. and with entirely parallel beds, so that an inclination of the columns toward the cell wall is not proved on this Temple. The same was likewise observed at the temples in Akragas, so that the rules applied on the Doric monuments of Attica and on the Temple of Poseidon, but were rejected in Sicily and at other places. They are not generally ap-

apparent on Ionic and Corinthian buildings.

The first of these was set on the step of the stylobate and the last was beneath the capital. The axis of the column then rose perpendicular to the upper bed of the lowest drum, the successive drums with parallel beds being arranged parallel to this. The lowest and the highest drums of the buildings mentioned measured on their external surfaces in an intersecting plane perpendicular to the cell wall, consequently do not exhibit equal heights; the upper drums further show the greater height on the side opposite that of the lower, since a horizontal resting place must be arranged for the architrave.(See the construction of the columns of the Parthenon, Fig. 122).

At the ends of the Parthenon (the sides are destroyed at the centre), the uppermost and lowest drums exhibit another peculiarity, since they have also different dimensions on their surfaces in a plane passet through their axes parallel to the tympanum. The larger measurements of the lower drums are in most cases on the surfaces toward the sides of the building (to the right and left of the centre of the building); the reverse occurs on the uppermost drums, where the greatest measurements are found on that side toward the middle of the building.

The differences between the two surface lines of the lower drums are not uniform, but diminish from the angle column toward the middle of the building for drums varying in height an inch or so, though not constantly or uniformly to right and left, so that omitting the angle column, the following differences in measurements result for drums averaging 2.89 to 3.11 ft. in height.

| | | | | | | |
|---|---|---|---|---|---|---|
| .472 | .354 | .118 | .000 | .118 | .472 | inches on east end. |
| .394 | .197 | .079 | .197 | .275 | .275 | inches on west end. |

With some forcing and in accordance with an imperfect passage of Vitruvius, one might conclude that a further arrangement of the axes of the columns was intended, were it not that the equal and unequal measurements on the lowest drums in a direction at right angles to the wall of the cell permit the possibility of indeed very slight inaccuracies in the preparation of the surfaces on which they rest, which might easily occur with the mode of construction described, and that the deformations of the stylobate make any positive conculsion impossible.

Differences in inches.

1.575 1.024 1.024 1.024 0.945 0.945 0.945 ~~1.457~~ inchest end.

1.220 1.221 0.787 1.496 0.984 0.866 0.866 1.535 inchest

Height of drums.

2.82 to 3.22 ft. on east end.

2.92 to 3.48 on west end.

Considering the deformation of the stylobate and the differences in measurements of the lower drums, if the positions of the axes be laid off, which may best be made clear and visible by a disproportionate increase of the measurements of the heights, the irregularities appear disturbing, though scarcely visible in reality, according to the graphical representation in Fig. 123, but it will hardly occur to a practical man to deduce from these imperfections special rules for the construction of buildings. The Parthenon and Propyleion have withal suffered so much from destruction in all ways, that we cannot declare everything now lound to have been originally intended to its entire extent.

Just as the walls consist of the plinth, the masonry above it and the crowning cornice as a termination, so the columns, excepting those of the Doric order, are subject to a division into three parts, consisting of the base, shaft and capital.

Not merely in form but also technically are these separated from each other, and they are again artistically combined into a whole.

On the uppermost smoothed step of the substructure (stylobate) rises the detached support, either absolutely vertical or slightly inclined toward the wall, in the form of a frustum of a cone with straight or curved external surface, sometimes in heavy and stumpy, sometimes in elegant and slender proportions.

The base is wrought from a single block and rests loose on a block of the stylobate or extends over two blocks, not being sunk into or fastened to them by dowells. Only in rare cases is this purely technical expedient employed, as for example on the Temple of Hercules in Akragas, the Sanctuary of Athena in Pergamon etc. The columns of the Temple in Akragas mentioned were thrown out along the longer side by an earthquake, so that both on the stylobate and the bottom surfaces of the lower drums of the columns are visible the dowell holes.(Also see the

[illegible] is built of blocks or tenons (drums), that accord-
ing to their ratio of diameter to height are connected by wood-
en or iron dowels. The architect [illegible]
point between the surfaces in contact, whether the joints re-
mained visible or again disappeared beneath a covering layer
of stucco.

The Doric column "as an earth born force", mostly corresponds
to of massive blocks, by its size and weight required in most
cases a special connection of the blocks together. When seem-
ed necessary for walls built of small ashlars south Doric be
cautious, while for slender Ionic and Corinthian columns, the
drums must be joined by iron dowels into a rigid support.
(see fig. 122).

To make possible a good jointing, that was strictly observed
and especially for the white marble columns not covered
by stucco, the beds of the drums were sunk towards the centre,
only the external annular surface being carefully smoothed
and rubbed, on which they rested and transmitted the loading.

The drums were fixed at the centre by the square wooden pi-
cots (fig. 122; examples of such in the museum at Dafnia, a-
thens etc.); in one was fixed a cylindrical pin, a circular
hole being bored in the other to receive one half of the pin.
[illegible]
[illegible] was [illegible], [illegible]
cor of centre. For this was necessary the solid instrument
with prisms in the stones, accurate dressing of the contact
surfaces, likewise with the aid of fine sand in case of sur-
ours in workmanship.

Corrections in the jointing could thus be made without large
outlays to hoist the stone afterwards.

The square wooden prisms and the cylindrical pin were not
intended as an arrangement for fastening, but they merely ren-
dered good service in setting. In proportion to the weight
of the stone, about 9.615 tons for a drum at the Parthenon,
[illegible] a cylindrical wooden pin measuring 1.95 inches in diame-
ter [illegible] appear as somewhat weak!

Temple of Apollo at Delphi, Fig. 124, and for Pergamon, Plate 22 of the second volume of the splendid work on Pergamon.)

The shaft is either monolithic , or in by far the most cases is built of blocks of unequal sizes (drums), that according to their ratio of diameter to height are connected by wooden or iron dowells. The greatest value was placed on a fine joint between the surfaces in contact, whether the joints remained visible or again disappeared beneath a covering layer of stucco.

The Doric column "as an earth borne force", mostly constructed of massive blocks, by its size and weight required in most cases a special connection of the blocks together. What seemed necessary for walls built of small ashlars coulh here be omitted, while for slender Ionic and Corinthian columns, the drums must be joined by iron dowells into a rigid support. (See Fig. 126).

To make possible a good jointing, that was absolutely demanded and especially for the white marble columns not covered by stucco, the beds of the drums were sunk toward the centre, only the external annular surface being carefully smoothed and rubbed, on which they rested and transmitted the loading.

The drums were fixed at the centre by two square wooden blocks (Fig. 122; examples of such in the Museums at Munich, Athens etc.); in one was fixed a cylindrical pin, a circular hole being bored in the other to receive one half of the pin, whereby a rotation of the upper drum on the lower one about their middle axes was made possible, without its being moved out of centre. For this was necessary the solid fasteningof both prisms in the stones, accurate dressing of the contact surfaces, likewise with the aid of fine sand in case of defects in workmanship.

Corrections in the jointing could thus be made without being obliged to hoist the stone afterwards.

The square wooden prisms and the cylindrical pin were not intended as an arrangement for fastening, but they merely rendered good service in setting. In proportion to the weight of the stone, about 6.619 tons for a drum at the Parthenon, then a cylindrical wooden pin measuring 1.58 inches in diameter must appear as somewhat weak!

In spite of the sinking of the middle portion, the load remains great in proportion to the load. At the foundation, this measures on the lowest drum 2726.96 sq. ins = 19.896 sq. ft.; the weight of the drums above it, of the corresponding portion of the entablature, of the ceiling or the cornice, and of the roof is about 288,127 lbs. = 144.064 tons; [illegible] per sq. ft., while marble is only crushed by a load of 8882 to 9112 lbs. per sq. in. = 284.82 to 312.04 tons per sq. ft.

Likewise the Ionic and Corinthian columns were either constructed of one piece or composed of several drums, just as the nature of the material required. Thus for example, the columns in Ainani were marble monoliths 27.07 ft. high; on the contrary, those in Nilatus, like those in Priene and Delphi, were composed of separate drums, whose flutes were only cut after erecting, as for Doric columns, as shown by the remnants of the column of the Temple of Cybele in Sardis and by fragments of column at the Temple of Apollo in Miletus. On the corner of the architrave on the base block with the capital and between the cymas the guides and endings of the flutes.

We find the same precautions on the bed surfaces of the drums, as were employed for Doric columns; only for very slender columns in iron frequently employed as a means of fastening them, as on the remains of the western wall of the Erechtheion, overthrown by a hurricane some decades since, and which was decorated by three-quarter columns, and also to be still seen on the pilasters drums of the Temple of Cybele in Sardis. The iron pins were there immovably fixed in lead and temper in the lower bed of the block to be set, then being lowered into the corresponding holes in the upper bed of the block previously set, and the melted lead was then introduced by a small channel in order to fix it. (Figs. 126, 128).

Of the Corinthian Olympeion in Athens the shafts are constructed of 14 drums of unequal sizes, the capitals being in two courses, while the round bases with the square plinths are cut from a single block.

In spite of the considerable diameter, the drums are not merely set on each other in the mode previously described, as on the Parthenon and other temples, but according to the

In spite of the sinking of the middle portion, the bearing area remains great in proportion to the load. At the Parthenon, this measures on the lowest drum 2724.96 sq. ins= = 18.923 sq. ft.; the weight of the drums above it, of the corresponding portion of the entablature, of the ceiling of the portico, and of the roof is about 298,127 lbs. = 149.064 tons; consequently the load was 109.4 lbs. per sq. in. or 7.878 tons per sq. ft., while marble is only crushed by a load of 2845 to 7113 lbs. per sq. in. = 204.82 to 512.04 tons per sq. ft.

Likewise the Ionic and Corinthian columns were either constructed of one piece or composed of several drums, just as the nature of the material required. Thus for example, the columns in Aizani were marble monoliths 27.07 ft. high; on the contrary, those in Miletus, like those in Priene and Sardis, were composed of separate drums, whose flutes were only cut after setting, as for Doric columns, as shown by the shafts of the columns of the Temple of Cybele in Sardis and an unfinished column at the Temple of Apollo in Miletus. On the former are wrought on the same block with the capital and beneath the cyma the guides and endings of the flutes.

We find the same precautions on the bed surfaces of the drums, as were employed for Doric columns; only for very slender columns is iron frequently employed as a means of fastening them, as on the remains of the western wall of the Erectheion, overthrown by a hurricane some decades since, and which was decorated by three-quarter columns, and also to be still seen on the prostrate drums of the Temple of Cybele in Sardis. The iron pins were there immovably fixed in lead and tamped in the lower bed of the block to be set, then being lowered into the corresponding holes in the upper bed of the block previously set, and the melted lead was then introduced by a small channel in order to fix it. (Figs. 125, 126).

On the Corinthian Olympeion in Athens the shafts are constructed of 14 drums of unequal sizes, the capitals being in two courses, while the round bases with the square plinths are cut from a single block.

In spite of the considerable diameter, the drums are not merely set on each other in the mode previously described, as on the Parthenon and other temples, but according to the

Doric method (Fig. 125, Erechtheion and Temple of Cybele in Sardis), indeed for the same reason and on account of the greater depth of the shafts of the columns, they are connected by iron dowels. Two or four of these are fixed in a cross by cast lead and are inserted in the manner given in Fig. 129; short channels lead to the dowel holes for pouring in the molten lead.

Besides this procedure, Fölsewey gives another mode of introducing the cast lead at the relatively very ancient Temple in Mesa, for there the upper block was drilled through, the fluid lead being poured through the drill hole. A line system with pouring channels passing vertically and obliquely through the sphere is also given by Bohn for the Temple of Athena in Pergamon. That by this method, it the necessary place interfered then by pouring in horizontal channels is self-evident; but tamping the lead was then impossible, though it could be done at one side in horizontal channels; but tamping is of great importance for the strength of the connection. Thus the last method is less certain and good, and according to circumstances, it is also the older one.

On the same Temple in Pergamon the places of the columns exhibit round holes with pouring channels, in which were insertedpins 5.10 ins. square; to these corresponded holes in the arrises of the columns, the latter had completely rubbed bearing surfaces, so that they [illegible] merely on a border or annular surface. The stonemason proceeded merely on a border or annular surface. The stonemason proceeded in the column of the later period (here the 4 th century B.C.) required the changed system.[1]

Note 1. See Bohn, R. Altertümer von Pergamon. Vol. I. p. 5.

The practical construction of the columns may have been as follows:-- the drums were set and roughly brought into orderlier form, but the beds were already carefully dressed; for a more convenient transportation and terraps also for hoisting (cranes), there were left on the external surface a strong [illegible] as shown by unused and unfinished drums or the s-

Ionic method (Fig. 125, Erectheion and Temple of Cybele in Sardis), indeed for the same reason and on account of the slenderness of the shafts of the columns, they are connected by iron dowells. Two or four of these are fixed in a drum by cast lead and are inserted in the manner given in Fig. 127; short channels lead to the dowell holes for pouring in the melted lead.

Besides this procedure, Koldewey gives another mode of introducing the cast lead at the relatively very ancient Temple in Messa, for there the upper block was drilled through, the fluid lead being poured through the drill hole. A like system with pouring channels passing vertically and obliquely through the ashlars is also given by Bohn for the Temple of Athena in Pergamon. That by this method, if the necessary space were left, the fluid lead more certainly reached the place intended than by pouring in horizontal channels is self-evident; but tamping the lead was then impossible, though it could be done at one side in horizontal channels; but tamping is of great importance for the strength of the connection. Thus the last method is less certain and good, and according to circumstances, it is also the older one.

On the same Temple in Pergamon the places of the columns exhibit round holes with pouring channels, in which were fastened pins 3.15 ins. square; to these corresponded holes in the drums of the columns, the latter had completely rubbed bearing surfaces, so that they rested on their entire area and not merely on a border or annular surface. The slendered proportions of the columns of the later period (here the 4 th century B.C.) required the changed system.[1]

*Note 1. See Bohn, R. Altertümer von Pergamon. Vol. 2. p. 22. Berlin. 1885).*

The practical construction of the columns may have been as follows;-- the drums were set and roughly wrought into circular form, but the beds were already carefully dressed; for more convenient transportation and perhaps also for hoisting (setting), there were left on the external surface 4 strong bosses diametrically opposite (projecting 7.87 ins. and 16.54 ins. wide), as shown by unused and unfinished drums on the Acropolis of Athens. In this condition were these set on each

rubber (as shown by the frequently mentioned and never completed Temples in Paestum and Sardis), the flutes being worked only on the lowest and highest drums for a certain length in guides, then being entirely cut only after the building was completed.

On the Ionic columns of Temple C in Selinus, the preparation of the columns in the quarry was such, that the surface was cut polygonal according to the number of the flutes, the faces being again separated from each other by fillets, the corresponded to the later width of the fillets between the flutes of the finished column. Therefore after setting it was only necessary to cut the flutes; all other arrangements for them having been already made.

A very complicated and detailed preparation of the flutes is shown by a never finished drum of the Acropolis of Athens (fig. 182) and other similar arrangements at the Telesterion at Eleusis (Fig. 189). Of special interest should be the mode of joining the marble floor slabs beneath the bronze columns in the cell of the Temple of Zeus in Olympia with the preparing of the flutes on the lower (fig. 88).

After the column had been carefully dressed circular with the reference to the entasis, lines came on its surface and extending from the upper to the lower guides traced the intersections or fillets of the flutes, the follows then were worked out between these coordinates to fixed templates (fig. 188). Preparations for flutes on Temple at Sounus and on the Propylaeon of Eleusis (fig. 190). Therefore requires their workmanship of as strictly rising courses, exactly fitted to each individual drum, as well as to the varying diameters of the columns. Though these differ but slightly in Attic monuments, and proportionally also to the unequally great entasises. These irregularities are frequently quite important in older monuments; on the Temple of Zeus in Olympia, the diameters of the columns differ from 1.97 to 2.04 ms.(in 7.22, 7.85 and 7.85 ft.), and even as much as 11.4 ms. on the Heraion in Olympia, though there there for other reasons. The small columns in antis are slightly larger in diameter than the others; very they all stand along the upper step of the stylobate always equal distances from its outer edge. (Compare Lateneon

other (as shown by the frequently mentioned and never completed Temples in Egesta and Sardis), the flutes being wrought only on the lowest and highest drums for a certain length as guides, then being entirely cut only after the building was completed.

On the Ionic columns of Temple G in Selinus, the preparation of the columns in the quarry was such, that the surface was cut polygonal according to the number of the flutes, these faces being again separated from each other by fillets, that corresponded to the later widths of the fillets between the flutes of the finished column. Therefore after setting, it was only necessary to cut the flutes; all other arrangements for them having been already made.

A very complicated and detailed preparation of the flutes is shown by a never finished drum on the Acropolis of Athens (Fig. 128) and other similar arrangements at the Telesterion at Eleusis (Fig. 129). Of special interest should be the mode of joining the marble floor slabs beneath the poros columns in the cell of the Temple of Zeus in Olympia with the beginning of the flutes on the former (Fig. 95).

After the column had been carefully dressed circular with due reference to the entasis, lines drawn on its surface and extending from the upper to the lower guides traced the intersections or fillets of the flutes, the hollows then being worked out between these according to fixed templates(Fig.128). Preparations for flutes on Temple at Selinus and on the Didymaeon of Miletus (Fig. 130). Therefrom resulted their unbroken and steffly rising course, exactly fitted to each individual drum, as well as to the varying diameters of the columns, though these differ but slightly in Attic monuments, and probably also to the unequally great entasises. These irregularities are frequently quite important in older monuments; on the Temple of Zeus in Olympia, the diameters of the columns differ from 1.97 to 8.54 ins.(in 7.22, 7.38 and 7.51 ft.), and even as much as 11.4 ins. on the Heraion in Olympia, though indeed there for other reasons. The angle columns in some temples are slightly larger in diameter than the others; yet they all stand along the upper step of the stylobate always at equal distances from its outer edge. (Compare Parthenon

one lateral in Olympia). So slight an enlargement of the ja-
mb centers move the others, generally out a small portion
of an inch for such a great diameter and small reach, cont-
ributes nothing to their greater resistance and stability, so
that a practical reason for this arrangement may not be assum-
ed to consideration of the structure, the close spacing of
the columns does not without some additional reason leave any
reason which is quite impossible in many cases or must be wil-
fully secret, I [illegible], that as the single columns stand
isolated against the sky, they consequently appear of less di-
[illegible]
or recently their enlargement. In case of columns having a n
[illegible]
recess with a single incision, the intersection of the flutes
of the meeting, worked on the capital and the uppermost adjus-
ting drum, are separated from each other by a projecting band
(annulus) about 0.09 in. high. Both portions were nearly
finished before being set, at least the upper half of the drum,
and this precaution was required to prevent the angle from be-
ing broken away in being set. A similar precaution is likew-
ise found on the abacus to prevent injury of the angle, when
the architrave was placed on it.

The contact surfaces of the uppermost adjusting drum and of
the neckin or the capital are not parallel to the upper sur-
face of the lowest drum in the Parthenon; with a constant per-
[illegible]
circles, are also no circular form was the basis of the adjus-
ting and contains. On the easiest end, the differences in the
side lines of the adjusting drums vary as follows:--

From west to east sides, taking the columns from south to
north.

0.[illegible] 0.[illegible] 0.[illegible] 0.[illegible] ----- 0.[illegible] 0.[illegible] in.

[illegible]

A fixed one bottom increase or diminution from the middle
[illegible]
[illegible] found possible in the case of the lowest drums.

With the still larger upper diameter of the column, (3.[illegible]
[illegible]) and the slight differences in the side lines, co-
[illegible]
slight divergence of the cone, the ellipse would actually oil-

and Heraion in Olympia). So slight an enlargement of the angle columns above the others, generally but a small portion of an inch for such a great diameter and small height, contributes nothing to their greater resistance and stability, so that a statical reason for this arrangement may not be assumed; on consideration of the structure, the close spacing of the columns does not without some additional reason leave any basisn(which is quite impossible in many cases or must be wilfully sought ) for the view, that as the angle columns stand isolated against the sky, they consequently appear of less diameter than the others, so that neither does any optical reason require their enlargement. In case of columns having a n necking with a single incision, the intersection of the flutes of the necking, worked on the capital and the uppermost adjusting drum, are separated from each other by a projecting band (scamillus) about 0.39 in. high. Both portions were nearly finished before being set, at least the upper half of the drum, and this precaution was required to prevent the angle from being broken away in being set. A similar projection is likewise found on the abacus to prevent injury of the angle, when the architrave was placed on it.

The contact surfaces of the uppermost adjusting drum and of the necking of the capital are not parallel to the upper surface of the lowest drum in the Parthenon; with a constant penetrating axis assumed mathematically, the two could not be in circles, and also no circular form was the basis of the annulets and echinus. On the eastern end, the differences in the side lines of the adjusting drums vary as follows:--

From west to east sides, taking the columns from south to north.

0.533 0.620 0.551 0.533 0.562 ----- 0.492 0.453 in.

0.315 0.289 0.207 0.114 0.045 0.249 0.232 0.533 in.

A fixed and uniform increase or diminution from the middle toward each side is as little to be based on these figures, as was found possible in the case of the lowest drums.

With the still larger upper diameter of the columns, (3.77 to 3.87 ft.) and the slight differences in the side lines, only amounting to a small portion of an inch, i.e., with the slight divergence of the beds, the ellipse would actually dif-

[illegible]

[illegible] function of the axis of the upper drum solved the problem more nicely, and as a matter of course, made the surfaces circles. However perfected the execution of the masterpieces of Lkti-[illegible] was and is still so in part, yet slight defects in workmanship placed in, such as are shown in the unequal spaces between the columns, both above and below; the different divisions of the abacuses of the different columns and the different heights of the columns, both above and below, the different diameters of the abacuses of the different columns and the different heights of the columns, with the divergence of their axes, though as already indicated, these disturbances must be attributed to the exploration of power and the destructive conqueror, which the building suffered.

In spite of the slight practical value, that these given measurements have in regard to the general execution and for our judgement of the effect of the building, we must dwell on them [illegible]

[illegible] the Eringe at Athens, another peculiarity is still to be buttoned, which is not elsewhere found on Doric columns; the flutes are furnished with the so-called "ears" for a third part [illegible] fluted, certainly not Doric, columns of the two porticos of this monument. The flutes were higher and better cut before setting; but to prevent injuries to the fillets and [illegible] the flutes were not completed at four points; the bases, or between the fillets still remain visible at an inch or so above the floor (Fig. 124), which may have served for fitting [illegible] for the use of the crowbar.

The distances of the columns from each other in the Doric order are determined by certain arrangements in the triglyph; it is normal for the axis of the column to coincide with the middle of the triglyph, and so that from the axis of one column to that of the next, there are two metopes with a triglyph between them. If the metopes are now assumed to have equal width and a triglyph be placed at the angle, it is no longer possible for the axis of the angle column and the middle of

fer very slightly from the circular form, had not a slight deflection of the axis of the upper drum solved the problem more simply, and as a matter of course, made the surfaces circles.

However perfected the execution of the masterpieces of Iktinos was and is still so in part, yet slight defects in workmanship slipped in, such as are shown in the unequal spaces between the columns, both above and below, the different dimensions of the abacuses of the different columns and the d different heights of the columns, both above and below, the different dimensions of the abacuses of the different columns and the different heights of the columns, with the divergence of their axes, though as already indicated, some disturbances must be attributed to the explosion of powder and the destructive bombardment, which the building suffered.

In spite of the slight practical value, that these given measurements have in regard to the general execution and for our judgement of the effect of the building, we must dwell on them somewhat longer for other reasons.

On the small Doric columns in the interior of the Tower of the Winds at Athens, another peculiarity is still to be noticed, which is not elsewhere found on Doric columns; the flutes are furnished with the so-called "pipes" for a third part of their height (upwards from the base). On the low monolithic and fluted, certainly not Doric, columns of the two porticos of this monument, the flutes were lighter and better cut before setting; but to prevent injuries to the fillets and beds, the flutes were not completed at four points; the bosses between the fillets still remain visible at an inch or so above the floor (Fig. 181), which may have served for lifting them and for the use of the crowbar.

The distances of the columns from each other in the Doric order are determined by certain arrangements in the frieze;- it is normal for the axis of the column to coincide with the middle of the triglyph, and so that from the axis of one column to that of the next, there are two metopes with a triglyph between them. If the metopes are now assumed to have equal widths and a triglyph be placed at the angle, it is no longer possible for the axis of the angle column and the middle of

the twelve to coincide; therefore the intercolumnations between the middle column and those next adjoining it on the end and side depend on this arrangement, i.e., they must become less than the intercolumniations between all the other columns. Moreover, intentionally or unintentionally, do not always show equal distances from centre to centre. Thus on the Parthenon, for example, this masterpiece of antique skill, the intercolumniations should be equal, but often vary as much as 6.16 ins., while the columns of Ionian monuments are intentionally set at [illegible] [illegible] between the axes of the column standing beneath the centre of the pediment are greater; the intercolumniations gradually increase from the angles to the centre in this case.

These differences in the distances between the axes of the columns evidently produce similar case in the metopes, so that the latter can no longer have equal width.

The the limitations in the spacing of the columns of the Doric order is opposed as entire freedom for the Ionic and Corinthian. Nothing determines this for them except the good taste of the architect. The distances between the columns vary in all these orders within the limits of 5.16 to 17.71 ft.

A comparison of the exact distances for Doric and Ionic temples is given in Fig. 168.

Vitruvius distinguishes five different modes of arranging columns:

1. The [illegible] (Pycnostylos): [illegible] equal to 1 1/2 diameters of the column.
2. The [illegible] (Eustylos): 2 diameters.
3. The still more widely spaced arrangement (Diastylos): 3 diameters.
4. The excessively wide or distant arrangement (Aerostylos): [illegible]
5. [illegible]

Our authority states in regard to 3, that the architrave [illegible] necessarily on account of the wide intercolumniations; that neither a stone nor a marble architrave could be employed in 4, but continuous wooden beams must be laid on the columns.

the triglyph to coincide; therefore the intercolumniations between the angle column and those next adjoining it on the end and side depend on this arrangement, i.e., they must become less than the intercolumniations between all the other columns, which moreover, intentionally or unintentionally, do not always show equal distances from centre to centre. Thus on the Parthenon, for example, this masterpiece of antique skill, the intercolumniations should be equal, but often vary as much as 2.16 ins., while the columns of Sicilian monuments are intentionally set with different intervals, so that the distances between the axes of the columns standing beneath the centre of the pediment are greater; the intercolumniations gradually increase from the angles to the centre in this case.

These differences in the distances between the axes of the columns evidently produce similar ones in the metopes, so that the latter can no longer have equal widths.

The the limitations in the spacing of the columns of the Doric order is opposed an entire freedom for the Ionic and Corinthian. Nothing determines this for them except the good taste of the architect. The distances between the columns vary in all these orders within the limits of 5.15 to 17.81 ft.

A comparison of the axial distances for Doric and Ionic temples is given in Fig. 132.

Vitruvius distinguishes five different modes of arranging the columns:--

1. The closely set mode (Pycnostylos); intercolumniation equal to 1 1/2 diameters of the column.

2. The more extended arrangement (Systylos); 2 diameters.

3. The still more widely spaced arrangement (Diastylos); 3 diameters.

4. The excessively wide or distant arrangement (Aerostylos);

5. The arrangement with proper proportions (Eustylos); 2 1/4 diameters; for the middle columns 3 diameters.

Our authority states in regard to 3, that the architrave breaks easily on account of the wide intercolumniations; that neither a stone nor a marble architrave could be employed in 4, but continuous wooden beams must be laid on the columns.

[illegible]

column in proportion measurements of the Doric order, the following values will be found for the given temples.

| Monument. | Intercolumniation. | Actual length architrave. |
|---|---|---|
| 1. Cadscchio. | 2 3/5 lower diam. | 7.95 ft. |
| 2. [illegible] in Olympia | 1 3/4 | 10.75 |
| 3. Sarina, Temple D | 1 3/5 | 14.87 |
| 4. [illegible] Temple C | 1 3/5 | 14.88 |
| 5. [illegible] | [illegible] | [illegible] |
| 6. Paestum | 1 3/5 | 8.36 |
| 7. Pracleia | 1 1/5 | 8.02 |
| 8. Parthenon | 1 3/4 | 13.89 |
| 9. [illegible] | [illegible] | [illegible] |
| 10. [illegible] | [illegible] | [illegible] |
| 11. Ugento | 1 1/5 to 1 1/4 | 18.99 |
| 12. Athens, Propylaion, middle entrance | 2 3/5 | 17.83 |

Consequently neither one of Vitruvius' specifications is applicable to any of these arrangements of columns; the numbers 1 1/2, 2, 2 1/4 or 3 not being found among those given.

One would give himself no concerns (as shown by the actual magnitudes given for the lengths of architraves), were he to judge of the actual length of the architrave extending from centre to centre of the columns from the numerical ratio of the diameter to the interval between columns, without knowing the actual diameter of the column. The architraves of the Pronaiain-Propylaea in Cadscchio and of the Peraion in Cilicia appear long in comparison with other temples, if one be ignorant of the actual distance between axes of the columns or the magnitude of their diameter, and assumes a long architrave, and the use of that numerical ratio by itself led to [illegible] columns as in these two monuments, the architraves must have been of wood. This may possibly have been the case, but not on reason of the assumed wide spacing!

With equal distances between axes or length of architrave, an arrangement of columns may be pycnostyle, eustyle or diastyle, while the bearing surface of the architrave is diminished

If we investigate the ratios of intervals to diameters of columns in Grecian monuments of the Doric order, the following values will be found for the given temples.

| Monument. | Intercolumniation. | Actual length architrave. |
|---|---|---|
| 1. Cadacchio. | 2 3/5 lower diam. | 7.48 ft. |
| 2. Heraion in Olympia | 1 3/4 | 10.78 |
| 3. Selinus, Temple D | 1 3/5 | 14.87 |
| 4. Selinus, Temple C | 1 3/5 | 14.68 |
| 5. Egina | 1 3/5 | 8.53 |
| 6. Theseion | 1 3/5 | 8.56 |
| 7. Phigaleia | 1 1/3 | 9.06 |
| 8. Parthenon | 1 2/5 | 13.98 |
| 9. Corinth | 1 2/5 | 12.53 |
| 10. Selinus, Temple A | 1 1/4 | 9.81 |
| 11. Egesta | 1 1/5 to 1 1/6 | 13.88 |
| 12. Athens, Propyleion, middle entrance | 2 3/5 | 17.81 |

Consequently neither one of Vitruvius' appellations is applicable to any of these arrangements of columns; the numbers 1 1/2, 2, 2 1/4 or 3 not being found among those given.

One would give himself up to delusions (as shown by the actual magnitudes given for the lengths of architraves), were he to judge of the actual length of the architrave extending from centre to centre of the columns frsm the numerical ratio of the diameter to the interval between columns, without knowing the actual diameter of the column. The architraves of t the Fountain-Sanctuary in Cadacchio and of the Heraion in Olympia appear long in comparison with other temples, if one be ignorant of the actual distance between axes of the columns or the magnitude of their diameter, and assumes a long architrave, and the use of that numerical ratio by itself led to the erroneous assumption, that with such"wide spacing"of the columns as in these two monuments, the architraves must have been of wood. This may possible have been the case, but not by reason of the assumed wide spacing!

With equal distances between axes or length of architrave, an arrangement of columns may be pycnostyle, eustyle or diastyle, while the bearing surface of the architrave is diminished

or increased, and the diameters of the columns are correspondingly reduced in [illegible]. The variety [illegible] must may be quite cold and cause a very small stress in the architrave; merely compare the Temple in Sedecolic with the Propylaion in Athens; both monuments have the numerical ratio of 2 3/5, while the length of one architrave exceeds that of the other by 10.34 ft.

It is also an error for one to assume that the architrave constructed of common limestone required a closer arrangement of the columns, and that the use of marble first permitted a wider spacing. The Sicilian temples of Imsebone with a numerical ratio of 1 3/5 exhibit architraves with lengths averaging 14.44 ft., while Attic monuments or marble with ratios of 1 3/5 and 1 2/5 (Theseion and Parthenon) only show lengths of 5.86 and 12.92 ft.

According to the arrangement of the columns about the cell, Vitruvius distinguishes between the following amplifications:-

a. Arrangement in antis (pro en parastasin) or ante-temple, if the end wall of the temple is changed so that two columns stand between two antes.[1]

Note 1. Antae in Latin is pronounced in Greek.

b. Prostyle, if another row of columns is placed at a certain distance in front of the antes and columns of the ante-temple, and these are connected by an entablature continued to the right and left on the walls of the cell.

c. Amphiprostyle, if the same arrangement as in 'b' is to be found in front of both pediment walls.

d. Peripteral, when the cell is surrounded by columns with 8 at each end and 11 on each side, including the angle columns.

e. Pseudodipteral, if 8 columns stand at each end and 15 at each side, yet so that the walls of the cell must correspond to the third column from the angle, and also that entablature should it accordance of two intervals and one diameter of a column remains between the wall and the colonnade.

f. Dipteral, if 8 columns are at each end and double colonnade.

g. Pseudodipteral, if the walls of the temple are transferred in the intervals between columns and the area of the colonnade is raised and added to the cell, which thereby acquires-

or increased, and the diameters of the columns are correspondingly lessened or increased.(Fig. 138). The eustyle arrangement may be quite bold and cause a very small stress in the architrave; merely compare the Temple in Sadacchio with the Propyleion in Athens; both monuments have the numerical ratio of 2 3/5, while the length of one architrave exceeds that of the other by 10.34 ft.

It is also an error for one to assume that the architrave constructed of common limestone required a closer arrangement of the columns,and that the use of marble first permitted a wider spacing. The Sicilian temples of limestone with a numerical ratio of 1 3/5 exhibit architraves with lengths averaging 14.44 ft., while Attic monuments of marble with ratios of 1 3/5 and 1 2/5 (Theseion and Parthenon) only show lengths of 8.56 and 15.98 ft.

According to the arrangement of the columns about the cell, Vitruvius distinguishes between the following appellations:-

a. Arrangement in antis (naos en parastasin) or ante-temple, if the end wall of the temple is changed so that two columns stand between two antes.[1]

*Note 1. Antae in Latin is parastades in Greek.*

b. Prostyle, if another row of columns is placed at a certain distance in front of the antes and columns of the ante-temple, and these are connected by an entablature continued to the right and left on the walls of the cell.

c. Amphiprostyle, if the same arrangement as in b is to be found in front of both pediment walls.

d. Peripteral, when the cell is surrounded by molumns with 6 at each end and 11 on each side, including the angle columns.

e. Pseudodipteral, if 8 columns stand at each end and 15 at each side, yet so that the walls of the cell must correspond to the third column from the angle, and also that entirely around it atdistance of two intervals and one diameter of a column remains between the wall and the colonnade.

f. Dipteral, if 8 columns are at each end and double colonnades extend entirely around.

g. Pseudoperipteral, if the walls of the temple are inserted in the intervals between columns and the area of the portico is raised and added to the cell, which thereby experien-

experiences a material enlargement.

The given number of columns, arranged in the proportion of 6 to 11 or 8 to 15 (breadth to length) is retained in the least number of monuments; a tolerably great variety here prevails; the true number is not even invariably retained at the end, as the subjoined examples show:--

| | |
|---|---|
| Metroon in Olympia | 6 to 11 |
| Fountain-Sanctuary in Cadacchio | 6 to 12 |
| Temple on Egina | 6 to 12 |
| Temple of Zeus in Olympia | 6 to 13 |
| Theseion in Athens | 6 to 13 |
| Temple in Nemea | 6 to 13 |
| Temple of Hera in Akragas | 6 to 13 |
| Temple D in Selinus | 6 to 13 |
| Temple A in Selinus | 6 to 14 |
| Temple in Egesta | 6 to 14 |
| Temple of Poseidon in Paestum | 6 to 14 |
| Temple S in Selinus | 6 to 14 |
| Temple of Athena in Syracuse | 6 to 14 |
| Temple in Phigaleia | 6 to 15 |
| Temple R in Selinus | 6 to 15 |
| Temple of Hercules in Akragas | 6 to 15 |
| Heraion in Olympia | 6 to 16 |
| Temple of Zeus in Selinus | 6 to 16 |
| Temple C in Selinus | 6 to 17 |
| Artemesion in Syracuse | 6 to 18 |
| Temple of Zeus in Akragas | 7 to 14 |
| Parthenon in Athens | 8 to 17 |

For accurately fixing the centres of the columns, there was employed in the Temple of Zeus in Olympia (western side) the arrangement, that in the stylobate block, which should receive the column, a hole of about a hand-breadth was cut at the middle of the bearing surface, and this was filled with lead and leveled off. On the surface of the lead was then marked the centre of the column by two lines intersecting at right angles, and it was then set. Likewise at the Tholos in Delphi are preserved such setting crosses, but scratched directly on the marble.

Antes (parastades or ends of walls) give the necessary arch-

horizontal cords to the side walls of the cella, extend beyond the transverse walls, as borderes, vertical cauls, rather or of the same width as the columns and only slightly [illegible]

height is divided into three parts, also consisting of a base, shaft and capital.

The antes are so formed in plan, that the projection outside [illegible] as in the pronaos of the Treasury, or it merely forms a band, very narrow in proportion to its height, as in the substructure of the same temple; on the side of the wall turned inward with columns between antes, the antes have a width equal or similar to the diameter of the columns (compare Tarna and Priesleta); but with a colonnade placed in front, as in the Parthenon, all projection on this side is omitted. The front surface of the pier is in all cases not as much or more than the thickness of this portion of the cella wall.

The antes are required to follow the inclination of the walls and columns (Fig. 194); they are also diminished like columns in many cases and in a very strongly expressed way in the so-called Basilica in Paestum, less so and but a few inches in Tornelsis (2 and 3.39 ins.) and on the Parthenon (4.61 ins).

In one of the temples in Selinus, the regular antes give place to a fluted three-quarter column, whose centre coincides with the centre of the wall, a less artful solution of the termination of a wall and unworthy of imitation. (Fig. 196).

The base of the antes is generally formed by the projecting lower course, and it accordingly receives the same treatment as the lower part of the wall itself; with a richer treatment of that, a lower base is used (reverse ogee with narrow band), returned around as on the Treasury.

The surfaces of the antes remain absolutely plain and without ornament; only the fine bed joints of the courses of stone intersect them, being continuous with the joints of the end [illegible]

The capital of the antes in respect to form has no relation to that of the column in neither the Doric nor the Ionic orders.

Architectural ending to the side walls of the cell, extended beyond the transverse walls, as bordering vertical bands, narrow or of the same width as the columns and only slightly projecting from the plane of the wall; like the columns, their height is divided into three parts, also consisting of a base, shaft and capital.

The antes are so formed in plan, that the projection outwards from the side wall of the cell corresponds to the full thickness of a column, as in the pronaos of the Theseion, or it merely forms a band, very narrow in proportion to its height, as in the opisthodome of the same temple; on the side of the wall turned inward with columns between antes, the antes have a width equal or similar to the diameter of the columns (compare Egina and Phigaleia); but with a colonnade placed in front, as in the Parthenon, all projection on this side is omitted. The front surface of the pier is in all cases but an inch or so wider than the thickness of this portion of the cell wall.

The antes are required to follow the inclination of the walls and columns (Fig. 134); they are also diminished like columns in many cases and in a very strongly expressed way in the so-called Basilica in Paestum, less so and but a few inches in P Phigaleia (3 and 3.59 ins.) and on the Parthenon (4.61 ins).

On one of the temples in Selinus, the regular antes give place to a fluted three-quarter column, whose centre coincides with the centre of the wall, a less skilful solution of the termination of a wall and unworthy of imitation. (Fig. 184).

The base of the antes is generally formed by the projecting lower course, and it accordingly receives the same treatment asthe lower part of the wall itself; with a richer treatment of that, a lower base is used (reverse ogee with narrow band), returned around as on the Theseion.

The surfaces of the antes remain absolutely pain and without ornament; only the fine bed joints of the courses of stone intersect them, being continuous with the joints of the end walls.

The capital of the antes in respect to form has no relation to that of the column in neither the Doric nor the Ionic order. It is rather heavily treated on the earlier Sicilian tem-

the perfected style, fillets or narrow bands below the projecting leaves are added to this profile, and a delicate

the different portions, originally only painted, were sculptured in relief in the Maxenorine period.

A peculiarly erratic and heavy treatment is shown by the a ture capitals of Paestum, while those of Propaleia exhibit the most aspiring and freest forms (fig. 184).

On the stone temples the antes are wrought on the contours of the cell and are curved the same as those.

The antes of the Heraion in Olympia were made of wood, and on the upper portions of the walls of the cell indeed considerted of unburnt bricks, which required essential protection at

ses of sabiers (Figs. 185, 186) afford assured evidence of this. Anchor holes are cut in the threshold and double dove-

ine boards and table tops, were already known to the ancient

Baudbuch). The vertical grooves in the stone are further cut wider at back to prevent the springing of the projecting to

The form of the stone antes as narrow wall) bands is

connected with a reminiscence of the ancient construction in

is also to be found on ancient rectangular steles. The cyma-tium (cove moulding) first occurs on the works of the later

the 7 th century B.C., according to Puchstein (page 62, 63), (between the erection of the Treasury of the Siceans and that

temples; the uppermost course slightly projects beyond the surfaces of the antes and is decorated by a recurved leaf-moulding with a thin abacus above it; on the buildings of the perfected style, fillets or narrow bands below the projecting leaves are added to this profile, and a delicate crowning moulding is added to the abacus. The ornaments of the different portions, originally only painted, were sculptured in relief in the Alexandrine period.

A peculiarly archaic and heavy treatment is shown by the a ante capitals of Paestum, while those of Phigaleia exhibit the most aspiring and freest forms (Fig. 134).

On the stone temples the antes are wrought on the ashlars of the cell and are coursed the same as those.

The antes on the Heraion in Olympia were made of wood, since the upper portions of the walls of the cell indeed consisted of unburnt bricks, which required especial protection at a free ending. Arrangements on the floor and the lower courses of ashlars (Figs. 135, 136) afford assured evidence of this. Anchor holes are cut in the thresholds and double dovetail grooves are cut in the lower ashlar course to receive i inserted strips to hold the board wainscoting and protect it from injury. (Grooved-in cleats, such as we have on our drawing boards and table tops, were already known to the ancient Egyptian joiners, as shown by some small wooden chests in the Gizeh Museum at Cairo. Also see the succeeding volume of this Handbuch.). The vertical grooves in the stone are further cut wider at back to prevent the springing of the projecting bo boards.

The form of the stone antes as narrow wall bands is perhaps connected with a reminiscence of the ancient construction in wood, from the period in which the mixed mode of building in masonry and wood was in use.

The primitive form of the commended ante capital at Paestum is also to be found on ancient rectangular steles. The cymatium (ogee moulding) first occurs on the works of the later time and of the best period, and its invention dates back to the 7 th century B.C., according to Puchstein (page 52, 53), (between the erection of the Treasury of the Geloans and that

of the great temple in Neirab). It first occurs on clay ritualistic and in architecture on the wooden and stone members covered with terra cotta (Kalkriese, Olympia, Syracuse, Selinus), and thence finds its way into stone architecture. On the contrary, a very ancient structure near the mammisi at Deir el Bahri shows the angle of the wall without any vestige of an arris, with the construction of the wall as in fig. 167. The corresponding corner of the architrave is composed of stones dressed with the block, together with the underlying sphere of the cell. Therefore the tradition of an arris originally of wood was lost at a very early time; on the other hand, the inclosed-out angle stones recall the similar blocks in the lintel at Karnak on Crete!

For all three orders, besides the entire columns, there also occur three-quarter columns, for example at the angles of peripteral plans -- Temple of Zeus and Tomb of Theron at Agrigento, as well as on half columns before the cell walls of the same structures, the south front of the Erechtheion and the walls of the Dorpfeld monument of Lycurgus at Athens etc., which are mostly covered, like the walls of the corresponding cell walls. Detached from the masonry and attached in [illegible] at the Great Tomb in Mylassa and in the same manner at the [illegible] come into use at the angles, at the Agora and on the Prytaneion at Magnesia-a-M, the half columns with their axes at right angles are connected with the square angle pier.

Three-quarter columns connected in pairs and belonging to the Ionic order were found in Tiscumari (original block in Peterson Kubna in Lydia), and connected in threes, of the [illegible] Persepolis (Lineaire in Perrot). These were probably suggested by Egyptian or Assyrian models (compare Assyrian circular columns in Ebn-Hassan [1]) and by the great piers of four connected columns, rulle or bricks, whose bases are covered by [illegible] in the [illegible] Assyrian Museum in Konstantinopel. [illegible]).

[1] [illegible]

of the Great Temple in Selinus). It first occurs on clay objects and in architecture on the wooden and stone members covered with terra cotta (Metapontum, Olympia, Syracuse, Selinus), and thence finds its way into stone architecture. On the contrary, a very ancient structure near the Marmaria at Delphi shows the angle of the wall without any vestige of an ante, with the construction of the wall as in Fig. 137. The corresponding corner of the architrave is composed of stones dressed with the pick, together with the underlying ashlars of the cell. Therefore the tradition of an ante originally of wood was lost at a very early time; on the other hand, the hollowed-out angle stones recall the similar blocks in the Palace at Knossos on Crete!

For all three orders, besides the entire columns, there also occur three-quarter columns, for example at the angles of pseudoperipteral plans -- Temple of Zeus and Tomb of Theron at Akragas, as well as on half columns before the cell walls of the same structures, the south front of the Erectheion and the walls of the Choragic Monument of Lysicrates at Athens etc., which are mostly coursed, like the walls of the corresponding cell walls. Detached from the masonry and attached in pairs to rectangular free piers, they are employed at the Great Tomb in Mylassa and in the same manner at the Gymnasion at Epidauros. While in Mylassa simple square piers come into use at the angles, at the Agora and on the Prytaneion at Magnesia-a-M, the half columns with their axes at right angles are connected with the square angle pier.

Three-quarter columns connected in pairs and belonging to the Ionic order were found in Klazomenai (original blocks in Pergamon Museum in Berlin), and connected in threes, of the Doric order, were on the so-called Princesses' Building at Pergamon (likewise in Berlin). These were probably suggested by Egyptian or Assyrian models (compare Egyptian clustered columns in Beni-Hassan [1]) and by the great piers of four connected columns, built of bricks, whose beds are covered by cuneiform characters, in the Asian section of the Louvre Museum in Paris(Fig. 138).

*Note 1. See Die Aegyptische Pflanzensäule by Ludwig Borch-*

Three-quarter columns of the Ionic order, attached to the edges of twin rectangular piers were employed on the altar structure in Pergamon.(see Fig. 188; original blocks in Pergamon museum in Berlin). Quartile and bases are imitated from those of half columns and the surfaces of the shafts are fluted.

Coupled, coupled or double ante are to be seen on the north portico of the Erechtheion in Athens; coupled antae [illegible] portico at Knossos-S-A.

Pairs of 1-shape with projecting half columns occur on the proscenium of the theatres in Priene, Epidauros and other places.

Lines to the antae or one of the temples at Selinus, rectangular projections terminate the walls in the interior of the cell of the Sanctuary at Praesteis, in the form of Ionic half columns.(see Fig. [illegible]).

[illegible] tern work or a narrow range in movement or imagination, which [illegible] and whose treasures of form are believed to be exhausted by the representations in Wagob's plates, and the canonical forms of columns and entablatures therein included are given out as being the soul of Greeian architecture. The variant forms are as numerous as in the preceding and the succeeding historical styles, therewith being clearly well reasoned and rational, -- yet we must know and understand them! It then without prejudice, we compare with them our newest and most recent works, the artistic monsters produced by our high and low cultured rabble! For subdivided the wall surfaces are arranged at definite places slight projections bonded with the walls of the cell, correspondence to the forms of the selected order, [illegible] exhibit the like triple division and courses as the column. [illegible] for the Ionic order covers the interior capitals with small volutes and not current instead of the cove or band capital.

*Borchardt. Nymphea Lotussäule. p. 7. Berlin. 1897.*

Three-quarter columns of the Ionic order, attached to the edges of thin rectangular piers were employed on the Altar structure in Pergamon.(See Fig. 138; original blocks in Pergamon Museum in Berlin). Capitals and bases are imitated from those of half columns and the surfaces of the shafts are fluted.

Coursed, coupled or double antes are to be seen on the north portico of the Erectheion in Athens; coupled square piers joined by a panel are found on the Propylon in the east portico at Magnesia-a-M.

Piers of T-shape with projectink half columns occur on the prosceniums of the theatres in Priene, Epidauros and other p places.

Allied to the antes on one of the temples at Selinus, rectangular projections terminate the walls in the interior of the cell of the Sanctuary at Phigaleia, in the form of Ionic half columns.(See Fig. 138).

Likewise here is an abundance of diversity in the forms and technical execution according to the needs, nowhere being pattern work or a narrow range in movement or imigination, which Grecian architecture is frequently charged with cultivating, and whose treasures of form are believed to be exhausted by the representations in Mauch's plates, and the canonical forms of columns and entablatures therein included are given out as being the soul of Grecian architecture. The variant forms a are as numerous as in the preceding and the succeeding historical styles, therewith being chiefly well reasoned and refined, -- yet we must know and understand them! If then without prejudice, we compare with them our newest and most recent works, the artistic monsters produced by our high and low cultured rabble! For subdividing the wall surfaces are arranged at definite places slight projections bonded with the walls of the cell, corresponding to the forms of the selected order, that exhibit the like triple division and coursing as the columns, piers and antes,(Akragas, Priene, Miletus), except that for the Ionic order occurs the bolster capitals with small volutes and rich ornament instead of the cove or band capital. (Miletus).

The shaft is round, or three cusps as an innovation as a
[illegible] with a ribbed bowl left without ornament, except
[illegible] occasionally engraved thereon are to be so
[illegible]
[illegible] Forrel at Myiasas). A later period also adorned the pan-
[illegible] with rich ornament.

[illegible]
architrave, frieze and cornice, above this being the ceiling
and the roof. The latter was constructed of stone beams and
stone slabs or was panelled in wood. Wood was retained as the
material for the overhanging eaves roof from the first begin-
ning until the latest time; modern writers supported bonded
clay tiles or marble slabs, sheltering the interior from in-
[illegible] by weather. The architraves are either monolithic
(figure 7 in Salinas, according to Koldewey) or are composed
of two or three blocks in width.

The marble monuments these mostly have equal width; for
those of porous limestone, that received a coating of stucco,
[illegible]
on the temple of Zeus in Cyzicus, the three architrave blo-
[illegible] each other measure 8.88, 1.67 and 2.88 ft. in width.
[illegible]
while the rest of the surface is roughly such with the point,
[illegible] so much that the distance at the middle between
[illegible]
stucco was not reduced by this stonecutting or preparation,
but a more accurate and better joining was more easily se-
cured.

The helper is also divided in courses for the architraves
of the Dionysic Temple in Ikrasa [1] and for an entablature
found on the street of the treasuries at Olympia; the separa-
te courses have the considerable heights of 2.84 and 2.22 ft.
in the first case, while they are but 1.10 ft. high in the
second, with a width of 2.28 ft. (fig. 128). Of two courses
in Delphi is composed the architrave for temples C and D in
Selinus, according to Hittorf, as well as that of temple V.
Fig. 7. Hittorf. Pl. 28 and 2. 108. Round square pressed
[illegible]

The shaft is smooth, or there occurs as an innovation an e enclosure with a sunken panel left without ornament, except the inscriptions occasionally engraved thereon are to be so regarded.(Hadrian's Gate, Monument of Philopappus in Athens and Portal at Mylassa). A later period also adorned the panels with rich ornaments.

On the free pillars rested the entablature, composed of architrave, frieze and cornice, above this being the ceiling and the roof. The latter was constructed of stone beams and stone slabs or was paneled in wood. Wood was retained as the material for the protecting gable roof from the first beginning until the latest time; wooden rafters supported burned clay tiles or marble slabs, sheltering the interior from injuries by weather. The architraves are either monolithic (Temple F in Selinus, according to Puchstein) or are composed of two or three blocks in width.

For marble monuments these mostly have equal widths; for those of porous limestone, that received a coating of stucco, frequently occur differences in dimensions,so that for example on the Temple of Zeus in Olympia, the three architrave blocks beside each other measure 2.56, 1.67 and 2.88 ft. in width.T The separate beams touch along borders about 2.86 ins. wide, while the rest of the surface is roughly sunk with the point, frequently so much that the distance at the middle between the blocks amounts to 9.45 ins. (Propyleion at Athens). The strength was not reduced by this stonecutting or preparation, but a more accurate and better jointing was more easily secured.

Thb height is also divided in courses for the architraves of the gigantic Temple in Akragas [1] and for an entablature found on the street of the treasuries at Olympia; the separate courses have the considerable heights of 3.94 and 3.28 ft. in the first case, while they are but 1.10 ft. high in the second, with a width of 2.26 ft. (Fig. 139). Of two courses in height is composed the architrave for temples C and D in Selinus, according to Hittorf, as well as that of temple T.

*Note 1. Hittorf, Pl. 89 and p. 309, found square grooves on the under surfaces of the lowest architrave blocks, which*

centered behind the greatest projections of the capitals. Ta delicate flat marks of rust were discovered in these crevices, and conclusive from this, that iron bars were inserted in them, since the stone alone was not in condition to support the entablature lying above.

The stones of the Olympieion entablature only touch on margins of the horizontal bed surfaces, so that the beds of the sesamoid blocks are barely covered at the margins. On the Temple of Zeus at Pæstum, the crowning cove moulding is not cut on the same block as the architrave, but on separate stones, laid on the cover. The external architrave blocks are also joined together at a right angle; the internal ones join obliquely, being mitred at 45°. (Fig. 1884; also Paine and Olympieion).

The square blocks are carefully held together at the abutting joints by iron T-cramps set in cast lead (like the cramps of the coil walls); they generally rest freely on the columns without the use of any means of fixing them. (Fig. 1885; architrave of the propylaeum of Pæstum of Zeus in Athens).

The greatest stress in the architrave beams may perhaps occur actually on the blocks over the middle passage of the [illegible] and is 17.98 ft. long, its width is 2 × 2.86 ft. = 4.72 ft., and its height is 3.77 ft.; so that it has a sectional area of 17.85 sq. ft. The volume of the frieze, cornice, tympanum = 1366.7 cubic ft., one cubic ft. of marble being assumed to weigh 158.56 lbs., which gives 181,180 lbs. as the load of the architrave, which has at each end a bearing of about 54 [illegible].

Frieze and architrave in certain cases are wrought from a single block, as shown by fig. 1871 from Paestum, where to strengthen it pair to prevent joints. The architrave, frieze and cornice are vertically connected by iron dowells, lead-wires and sinews in different works by iron cramps set in lead.

The Doric frieze is composed of triglyphs, metopes, filling blocks and smooth friezes plain on the inner side (Fig. 1871),

*extended beyong the greatest projections of the capitals. He believes that marks of rust were discovered in these grooves, and concludes from this, that iron bars were inserted in them, since the stone alone was not in condition to support the stones lying thereon.*

The stones of the Olympian entablature only touch on margins of the horizontal bed surfaces, so that the beds of the separate blocks are barely covered at the margins. On the Temple of Demeter at Paestum, the crowning ogee moulding is not cut on the same block as the architrave, but on separate stones, laid on the other. The external architrave blocks abut against each other at a right angle; the internal ones join obliquely, being mitred at 45°.(Fig. 139; also Egina and Olympia).

The separate blocks are carefully held together at the abutting joints by iron T-cramps set in cast lead (like the stones of the cell walls); they generally rest freely on the columns without the use of any means of fixing them. (Fig. 140; anchoring of the architrave of Temple of Zeus in Athens).

The greatest stress in the architrave beams may perhaps occur actually on the blocks over the middle passage of the Propyleion in Athens. This architrave consists of two parts and is 17.82 ft. long, its width is 2 × 2.36 ft. = 4.72 ft., and its height is 3.77 ft.; so that it has a sectional area of 17.83 sq. ft. The volume of the frieze, cornice, tympanum and pediment cornice amounts to (4.72 × 17.82 × 13.48 ft. high) = 1133.7 cubic ft., one cubic fta of marble being assumed to weigh 168.55 lbs., whict gives 191,150 lbs. as the loading of the architrave, which has at each end a bearing of about 24 inches.

Frieze and architrave in certain cases are wrought from a single block, as shown by Fig. 141 from Epidauros, where no attention is paid to through joints. The architrave, frieze and cornice are vertically connected by iron dowells, lengthwise and sidewise in different works by iron cramps set in lead.

The Doric frieze is composed of triglyphs, metopes, filling blocks and smooth frieze slabs on the inner side (Fig. 141),

is neither executed uniformly in stonecutting, in coursing, nor in bonding. As for the architrave, it is normal to have one stone in height, with the setting of the triglyph blocks, the recessing of the metopes, the arrangement of small piers behind these, and a smooth and continuous frieze course with the height of the triglyphs, all carefully connected by I-cramps. This is especially true for the marble structures of the Doric order in the best period.

But exceptions are also not lacking here, for example, the great Temple of Poseidon at Paestum has a high frieze in two courses, whose lower portion is wrought as headers, while the upper one shows masonry in two courses behind it. Since the Temple was covered by stucco, the jointing then played no part. (See Division VI).

On the ancient Temple of Athene on the acropolis of Athens, the roughly dressed triglyph blocks are channeled slabs clamped together by dovetails. (Fig. 142 [1]).

*Note 1. See Die archaische Porosarchitektur zu Athen by Th-Wiegand. p. 8. Cassel & Leipzig. 1904.*

At temples R and D (Hittorf), instead of blocks behind the metopes were two courses of masonry, and one of the temples at Akragas were even three courses, where further the metope consisted of a single block, while at temples F and G, the metope slabs were composed of two pieces in height.

At the Sanctuary of Demeter in Paestum, the triglyphs were inserted and the frieze blocks abutted at the centre of the metopes (Figs. 141, 143), a jointing also retained on the Tholos in Delphi, excepting that these were not cut as separate blocks.(Fig. 142).

According to various publications,it was heretofore assumed, that the construction of the frieze of the Parthenon was executed with scholastic regularity. But the discoveries during the latest work of consolidation have again shown, that the Greeks were likewise economical of their stone for this masterpiece of theirs. They saved it, wherever possible, as appears from Fig. 144, that reproduces in general the stonecutting and the connection by cramps in an authentic way, according to the measured drawings of Mr. N. M. Balanes in Athens,

chief engineer and director of the work of strengthening the Parthenon, most kindly transmitted to me.

The distribution of the triglyphs in the frieze is then such, that one comes over each column and one above each interval, the centres of the columns and triglyphs coinciding in one case and those of the intervals and triglyphs in the other; an exception is only made in case of the angle column, since a triglyph always forms the angle of the frieze. The triglyphs and metopes usually have equal widths among themselves; if these are to be retained and carried out in the frieze, t the mode of arranging the columns will necessarily depend on the subdivision of the frieze. Under this assumption and with the use of an angle triglyph, there must be a smaller i interval between the angle and next columns, than between the second and third or third and fourth.(Fig. 145).

If the resulting unequal intervals between the columns are to be avoided, only two methods exist; to make the metopes next the angle, or these and those next succeeding, wider than the others, or to give up the angle triglyph, the latter being usually preferred in Roman art and in that of the Renaissance, in order to make equal distances of the columns from each other possible, and to produce no disturbance in the frieze.

On Sicilian monuments, as already mentioned, where the intercolumniations are all different, i.e., increase towards the middle, it is self-evident that the metopes are likewise of different widths; differences in dimensions also occur at the Parthenon, produced by inaccuracies in the arrangement of the columns and in the execution; for the same reason, the regulas and drops are not always exactly beneath the triglyphs. For example, the second on the eastern side, counting from the southeast angle, is displaced about 5/32 inch. These petty irregularities in the Attic masterpiece must not be confounded with the intentional ones on Sicilian monuments.

Three solutions are then possible in the treatment of the frieze:--

1. Metopes and triglyphs equal among themselves, using the angle triglyph, then unequal intercolumniations.

2. Triglyphs equal, but metopes nearest the angle larger, retaining the angle triklyph, then with equal intercolumniations.

3. Metopes and triglyphs each equal among themselves, with equal intercolumniations, the angle triglyph then abandoned, a half metope being employed at the angle. (Fig. 145).

The last solution is not employed on any Grecian monument; it was indeed assumed for the Temple of Demeter in Paestum by Delagardette; but I may doubt its correctness.

Vitruvius terms the solution defective "whether made by lengthening the metopes or reducing the intercolumniations", and it results from this that the ancients had in the course of time avoided the use of the Doric order in their temples. With the abundance of Doric monuments, which originated in t the best period and were still built until the period of decline, this principle of Vitruvius appears somewhat singular; Vitruvius indeed quotes the evidence of some ancient architeects,of Tarchesios (otherwise unknown), of Pythios (builder of the Temple of Athene at Priene), and of Hermogenes (builder of the Temple of Artemis at Magnesia), as saying that on account of the defective and inharmonious proportions of the members, no more great temples of the Doric order should be erected.

The normal distribution of the triglyphs shown as being usual for Grecian Doric temples with closely set columns, Vitruvius designates as "monotriglyphic", i.e., with one triglyph above each intercolumniation (Book IV, Chap.3), in contrast to those with two or three triglyphs for each intercolumniation of buildings with widely spaced columns.(Compare t the central passage of the Propyleion and that of the Market Gate at Athens).

The Artemesion in Syracuse with closely set columns shows at the ends greater intercolumniations than at the sides. A normal division of the triglyphs and metopes is impossible, an approximate one being so, only when the two metopes at the right and left of the ridge line of the pediment were made c considerably wider than the others. The eye might still bear such an enlargement, but only two solutions would be possible

for the sizes (I and II at Fig. 146); either the triglyph is [illegible]. [illegible]
a last expedient would be to deny the triglyph frieze on this [illegible], since it would harmonize little with the heavy architrave.

Another and a fourth solution could also be found in the projection or recession of the angles of the architrave at the angle column. In the Ionic cases, the angles of the architrave jutting the sides and ends of the temple lie vertically over the external line of the uppermost drum of the column. The corners projecting more or less or are even set back from [illegible] tal. On the Temple of Ecsedion at Pergamon and the Artemisi-tical pieces tangent to the uppermost drums of the angle col-umns; on the Temple at Priene and on the Temple of Apollo at Bassaurtum, these corners differ by 3/4 foot; on the Temple of Apollo on Cyrene, the front surface of the architrave [illegible] feet about 7.08 ins. beyond the transverse plane mentioned. [illegible] ater (Pergamon) at Pergamon about 8.16 ins., on the Temple Palmyra at Baalbeck about 1.88 ins., over 7.08 ins. on the Temple of Athene on Cyrene, about as much for a temple in Sicilia, on the Temple of Jupiter at Pergamon about 5.51 ins., about 4 1/2 feet on the Parthenon in Athens, and about 17 feet on the Theseion there. On Temples C and D in Selinus, the angle of the architrave is set back about 1.97 ins. etc. (Fig. 147).

[illegible] tudes, even if but moderately so, set one still much. The [illegible] ments of - 1.97 ins. through 0 to + 7.08 ins., then up to 16.11 ins. for the entire length of a (pediment) end. Having [illegible] length of the pediment architrave, for example on the Pergamon or Cyrene, the treatment of the friezes become more [illegible]

for the sides (I and II of Fig. 146); either the triglyph is omitted over the intercolumniation, or disproportionately narrow metopes and triglyphs are assumed. Both are equally ugly. A last expedient would be to deny the triglyph frieze on this Temple, since it would harmonize little with the heavy architecture.

Another and a fourth solution could also be found in the projection or recession of the angles of the architrave at the angle columns. In the fewest cases, the angles of the architrave joining the sides and ends of the temple lie vertically over the external line of the uppermost drums of the columns. The corners project more or less or are even set back from this, according to the form and projection of the echinus capital. On the Temple of Poseidon at Paestum and the Artemesion at Syracuse the angles of the architrave coincide with vertical planes tangent to the uppermost drums of the angle columns; on the Temple at Egesta and on the Temple of Apollo at Metapontum, these scarcely differ by 3/8 inch; on the Temple of Apollo on Ortygia, the front surface of the architrave project about 7.09 ins. beyond the tangential plane mentioned, likewise on the Basilica (enneastylos) and the Temple of Demeter (hexastylos) at Paestum about 3.15 ins., on the Tavole Paladini at Metapontum about 1.38 ins., over 7.09 ins. on the Temple of Athene on Ortygia, about as much for a temple in Selinus, on the Temple of Juno at Akragas about 5.51 ins., about 4 1/2 parts on the Parthenon in Athens, and about 17 parts on the Theseion there. On Temples C and D in Selinus, the angle of the architrave is set back about 1.97 ins. etc. (Fig. 147).

Therefore the lengths of the architrave are extensible magnitudes, even if but moderately so, yet are still such. The variation for temples of medium dimensions varies between the limits of - 1.97 ins. through 0 to + 7.09 ins., then up to 18.11 ins. for the entire length of a (pediment) end. Making use of this freedom, i.e., based on the maximum of the total length of the pediment architrave, for example on the Artemesion at Syracuse, the treatment of the frieze became more uniform, permissible, and harmonizing more with the temples otherwise known.

al did not permit for purely technical reasons the projection of the architrave beyond the transom plane of the uppermost crown. It was only more possible in the time of the best period, when the steep cornice was in fashion and dense lime-stone came into use. Perhaps optical reasons contributed to the surface of the architrave toward the edge of the abacus of the capital, was desired to conceal as little of it as possible.

Since the marks of the derivation of the triglyph frieze on existing monuments of stone from any other mode of construction were lost in consequence of its change of the setting of the portico, and the frieze thereby became already in the certain sense at an alien remnant, as a meaningless ornament, there remains for its explanation only the assumption, that architectural conditions not preliminary to an immediate, but, indeed, only transmitted, the principle by which tion in the building cannot be explained.[1]

[illegible] ere may be understood is proved by the arrangements of the tri-[illegible] tracted the two-story stoa in Athens and Pergamon.

If we believe in a preceding wooden construction, then in Brunlaeck[2] right, when he says that the triglyphs are wider or enlarged dentils (explained as the ends of beams, as visible cross beams, which again suspended upon the walls of the [illegible] one the changed form of the dentils,[1] and the use of one or-[illegible]

[illegible] cottes of lower Italy and Sicily triglyph friezes and dentils [illegible]

[illegible] Brunlaeck, p. 72.

[illegible] p. 44.

The strongly projecting Doric slab capitals of soft material did not permit for purely technical reasons the projection of the architrave beyond the tangent plane of the uppermost drum. It was only made possible in the time of the best period, when the steep echinus was in fashion and dense limestone came into use. Perhaps optical reasons contributed to the procedure (See Plato's Sayings, Chap. VI); by projecting the surface of the architrave toward the edge of the abacus of the capital, men desired to conceal as little of it as possible.

Since the marks of the derivation of the triglyph frieze on existing monuments of stone from any other mode of construction were lost in consequence of the change of the ceiling of the portico, and the frieze thereby became already in the earliest period of the stone temple merely an ornamental accessory, there remains for its explanation only the assumption, that historical traditions and recollections of an architecture, that long since disappeared, for otherwise its function in the building cannot be explained. [1]

*Note 1. Finally, how little the original connection between the structural and the ornamental form of the Doric frieze may be understood is proved by the arrangement of the triglyph frieze on the Arsenal of Philo, with which are then contrasted the two-story stoas in Athens and Pergamon.*

If we believe in a preceding wooden construction, then is Dieulafoy [2] right, when he says that the triglyphs are wider or enlarged dentils (explained as the ends of beams, as visible in Lycian tombs), whose dimensions were fixed by those of the cross beams, which again depended upon the weight of the roof and of the covering material. Then is the triglyph frieze the changed form of the dentils, [1] and the use of one ornament would exclude that of the other on the same building. And yet we find (Figs. 5, 6, p. 11) on truly ancient terra cottas of lower Italy and Sicily triglyph friezes and dentils over each other! The late period indeed did the same (see Pergamon and other places); yet we must not take this into account here.

*Note 2. Dieulafoy. p. 66.*

*Note 1. See Göller, p. 78.*

11 - A1: "If one re of the opinion that where triglyphs are have taken the place of windows. For the intervals on both sides, both between the dentils and also between the triglyphs, were termed "metopes"; for the Greeks call the places of beams and holes "opai", as our countrymen term these holes "dove-holes" (columbaria). Thus the intervals between beams, which are round between two of their positions (opai) are termed "metopes" by them."

Hence the opai are holes in the masonry for beams, or in modern language, "holes for thrown beams", but in wooden construction are the places at which the ceiling beams rest or the architrave.

Therefore in one case the metope is a piece of masonry between the beams, in the [illegible] in the completed stone or wooden framed construction is it a hole or a small window.

According to the usage of the Greek language, the word "metope" the eye, also a solid body, a division between two overlaps. [illegible] beam Zea § (contact of Antyxomos, son of Geneticos of erection of an arsenal near Zea), for there "metopon" signifies a stone pier or door-jamb, especially the million at the centre of a double doorway, a division between two overlaps. [illegible] Lines 22-26. Berlin. 1888.

The passage in question runs thus in the original.(see the [illegible] before me, one by Choisy §, the other by Boom.

Auge: L'Architect du Ritre. Paris. 1888. Also Vacerious in Rees. [illegible] p. 570.

[illegible] 4. In [illegible] p. [illegible]. [illegible]. p. [illegible].

by Choisy:- "reservoir on the width of the arsenal doors i

In explanation of the triglyph frieze, Vitruvius says (Chap. II - 4); "if one be of the opinion that where triglyphs are now found, there were openings for light, one should for the same reasons believe also that the dentils in Ionic buildings have taken the place of windows. For the intervals on both sides, both between the dentils and also between the triglyphs, were termed "metopes"; for the Greeks call the places of beams and poles "opai", as our countrymen term these holes "dove-holes" (columbaria). Thus the intervals between beams, which are found between two of their positions (opai) are termed "metopes" by them."

Hence the opai are holes in the masonry for beams, or in modern language, "holes for through beams", but in wooden construction are the places at which the ceiling beams rest on the architrave.

Therefore in one case the metope is a piece of masonry between two holes for beams, to be filled later, but neither in the completed stone or wooden framed construction is it a hole or a small window.

According to the usage of the Greek language, the word "metopon" denotes the part over the root of the nose and between the eyes, thus a solid body, a division between two openings. It is used in this sense in the building contract for the Arsenal near Zea [2] (Contract of Enthydomos, son of Demetrios of Miletus, and of Philon, son of Exekestes of Eleusis, for the erection of an arsenal near Zea), for there "metopon" signifies a strong pier or door-jamb, especially the mullion at the centre of a double doorway, a division between two openings.

*Note 2. Corpus Inscriptionum Atticarum. II; 2, No. 1054, lines 22-26. Berlin. 1883.*

The passage in question runs thus in the original.(See the text in Durm). Two translations or interpretations of it lie before us, one by Choisy [3], the other by Bohn.[4]

*Note 3. Choisy, A. Etudes sur l'Architecture grecque. Ire. Etude; L'Arsenal du Piree. Paris. 1883. Also Fabricius in Hermes, 1882, p. 570.*

*Note 4. In Centralblatt d. Bauw. 1882. p. 296.*

By Choisy:- "reserving on the width of the arsenal, doors to

the number of two on each side; width nine ft. And on each side between the two doors, build a dividing mullion having a width of two ft. and set ten ft. toward the interior. And carry to the first pillars the wall, against which opens each of the two doors."

By Bohn:- "but openings for doors at the ends are to be left, two of those at each end, nine ft. wide. But on both sides shall a space be arranged (metopon) between the doors (their walls ?) two ft. wide, but to project inward two ft., the wall shall bend around to the first columns, and also each one of the leaves of the doors to open against it."

Choisy's interpretation is correct and that of Bohn is not; the point will be more easily understood by means of the sketch in Fig. 148 according to Choisy's views, who should more properly have used the word "openings" instead of "doorways". "Duraias" (openings for doors) seems to have been intentionally written the first time, and "duron" (doors) the second time. For only by means of the end wall inserted at the centre, -- the metopon -- were there two doors!

As in Vitruvius the metope is the piece of masonry between the holes for two beams, so is it also with the Athenians the strong dividing and supporting pillar between two openings for doors, and if Vitruvius excludes the assumption, that the triglyphs were windows, according to him and the preceding Grecian building contract, the metopes were still less window openings! Triglyphs are indeed mentioned twice in the contract of Philo; but they are never opposed to metopes.[1]

*Note 1. "Metope" otherwise briefly signifies "face" or "front". "Metopon" and "metopou" are to be understood in this sense in the building contract for the Athenian walls. (Corp. Inscr. Att. II. Berlin. 1877. No. 167, lines 40, 66). It there simply means "front."*

In the building inscription of the Asklepion [2], the structural parts above the columns do not receive the names otherwise current, but:--

The architrave is designated by "to stroma."

The frieze by "poistasis"(what sits on the architrave).

The cornice with the stroteras and calymmatias by "stora."

*Note 2. See Baunack, J. Aus Epidauros. Eine epigraphische Studie. Leipzig. 1890.*

The complex jointing of the Doric frieze gives place to the simplest conceivable for the Ionic and Corinthian orders. On the monolithic architrave, or one composed of several slabs, lie the long frieze slabs, either plain or decorated by figures, connected by cramps, perpendicular to them being the wood or stone supporting beams of the ceiling with smooth filling blocks inserted between them.

On monuments of the Ionic style, that more closely adhere to a preceding wooden construction, a frieze is in general doubtful. (Athena Polias at Priene, Caryatid portico of the Erectheion, Tomb of Nereids in Xanthos, in which the architrave is adorned by a figure compositionl like the Temple in Assos). The two Figs. 149, 150 reproduce the entablatures of the Temple of Athena Polias in Priene and that of the Artemesion in Magnesia-a-M from the original fragments, and they exhibit the jointing of the entablature on the assumption of a marble coffered ceiling and of a beam ceiling with sheathing and strips planted thereon inserted plain panels.

The crowning principal cornice remains in meaning the same in the construction of all three orders; a single, strongly projecting slab, which protects the underlying portion of the entablature from wind and weather, and ties together the masonry in the theckness of the wall, whereby the ashlars are strongly connected by dowells and cramps.

The strongly undercut water drip is common to all, equally whether beset by mutules (Doric) or whether continued in a b beautifully recurved line from the sharp front edge to the ogee leading to the flat surface (Ionic, Corinthian). The anathyrosis (recession) is everywhere carried out on abutting surfaces, but in its location regard is not always paid to the ashlars of the frieze lying beneath it. For example, the end joints on the Parthenon coincide at one side with those of the triglyphs, and in Egesta they are correctly bonded and meet at the middle of the triglyphs and metopes. That the t triglyphs are to be regarded as structural and as merely the supports of the cornice slabs is therefore incorrect.(Fig.151).

for porticos, the coffered wooden ceiling or that decorated
beams are everywhere recognizable on the buildings, so that
for the construction of stone ceilings, the beams are usecf
[illegible]

As chronologists may first be emphasized their position in
height. In Doric buildings, they lie above the architrave
ly above the architrave.

According to construction, they are divided into coffered
ceilings of stone slabs (sides of the Parthenon, corydoid por-
tico of the Erechtheion), and those constructed of stone beams
on which vaulted coffered slabs (ceiling of corydodome of the
Parthenon, ceiling of north portico of Erechtheion). A great-
er simplification is exhibited by the last arrangement, when
in place of the stone coffered slab, thin perforated cons co-
ut, where square openings are again closed by small horizon
covers.(Temple of Theseus in Athens). Fig. 168 gives a repres-
entation of the different stone ceilings of the Parthenon, 9
Fig. 169 is such of the Erechtheion, and Fig. 164, 165 are t
those for the porticos of the Temple of Theseus.

The beams are in part fastened by iron dowells, and are con-
nected with the intermediate blocks by I-cramps, but are arr-
anged without regard to the location of the columns, as shown
by the ceiling of the Parthenon, the Erechtheion, the Temple
of Zeus Lepsinos, and of the Temple in Phigaleia.(Fig. 166:

[illegible]

division of the stone ceiling by beams, structures and entyam-
ature is given by Fig. 167, after the still existing structu-
at the Theseion in Athens.

Even the preceding examples differ the ceilings on the
ment of Marcide in Xanthos, where the merely ornamentally in
dicated small beams are wrought from a single slab together
with the panels (Fig. 168), and then that of the Propos at

[illegible]

For porticos, the coffered wooden ceiling or that decorated by strips long maintained itself. The bearings of the wooden beams are everywhere recognizable on the buildings, so that fixed starting points for their former existence are obtained. For the construction of stone ceilings, the beams are either still in place, or their assured parts lie on the ground.

As characteristic may first be emphasized their position in height. In Doric buildings, they lie above the slab with the drip moulding, but for the other orders, they commence directly above the architrave.

According to construction, they are divided into coffered ceilings of stone slabs (sides of the Parthenon, caryatid portico of the Erectheion), and those constructed of stone beams on which rested coffered slabs (ceiling of opisthodome of the Parthenon, ceiling of north portico of Erectheion). A greater simplification is exhibited by the last arrangement, when in place of the strong coffered slab, thin perforated ones occur, whose square openings are again closed by small hollowed covers.(Temple of Theseus in Athens). Fig. 152 gives a representation of the different stone ceilings of the Parthenon, F Fig. 153 is such of the Erectheion, and Figs. 154, 155 are t those for the porticos of the Temple of Theseus.

The beams are in part fastened by iron dowells, and are connected with the intermediate blocks by I-cramps, but are arranged without regard to the location of the columns, as shown by the ceilings of the Parthenon, the Theseion, that of Temple of Nike Apteros, and of the Temple in Phigaleia.(Fig. 150; plan of ceiling).

A representation of the characteristic construction and subdivision of the stone ceiling by beams, stroteras and calymmatias is given by Fig. 157, after the still existing structure at the Theseion in Athens.

From the preceding standards differ the ceilings on the Monument of Nereids in Xanthos, where the merely ornamentally indicated small beams are wrought from a single slab together with the panels (Fig. 158), and then that of the Tholos at Delphi, that at Epidauros (Fig. 159, 160), and still others. Also in a quite peculiar way, that of a Tomb in Mylassa, where stone beams extending parallel to the diagonal alternate in

heights, pending to the flattened apex of the structure.(5)a.

Unfortunately no vestiges of the ceilings of the cell pro-
ner preserved, and no monument throws any light on what it
was, of what material it consisted, and how it was constructed.
Pausanias refers in the extreme condition of ancient temples, per-
mit it to be safely assumed, that these ceilings were of per-
ishable materials, and the knowledge of so many conflagrations
of temples, that they were made of wood. Not proven for most
is the law, that on account of its considerable span, the cen-
tral space of the cell could be covered with wood alone.

The marble slabs of the temples on Ægina, in Bridgeleia,
and at the Heraion at Olympia, measure 10.78, 14.47 and 12.47
ft. [illegible] ft. [illegible] ft. [illegible] ft. (Dörpfeld
ion), etc. occur as sufficient, both constructed of common l
limestone as well as of marble. The possibility of a stone
slabs, even though I may doubt its use.

Pausanias gives some points in regard to the arrangement of the
ceiling and the roof.

During remarks made to the latter, "the corses of a heavy-
ness for ornament, the other for supporting the roof." it res-
ults from this, that a decorative horizontal ceiling covered
timber roof. In its construction of the closed horizontal
ed intervals, then crossed at right angles by longitudinal
beams lying on them, the intervaces being again divided in
panels by short beams and closed by board panels above.

Pausanias mark verbally pointed terra cotta enclosed the
beams on three sides like cases, or with noble metals and
these decorative ceilings. Pausanias mentions in Athens "

height, reaching to the flattened apex of the structure.(Fig. 161 and its derivation from wooden construction).

Unfortunately no vestiges of the ceiling of the cell are now preserved, and no monument throws any light on what it was, of what material it consisted, and how it was constructed. The complete lack of the structural portions appertaining thereto in the ruinous condition of ancient temples, permit it to be safely assumed, that these ceilings were of perishable materials, and the knowledge of so many conflagrations of temples, that they were made of wood. Not proven for most is the law, that on account of its considerable span, the central space of the cell could be covered with wood alone.

The middle aisles of the temples on Egina, in Phigaleia, and of the Heraion at Olympia, measure 10.73, 14.47 and 12.47 ft.; architraves and stone beams in lengths of 14.63 ft. (Temple C in Selinus), 13.98 ft. (Parthenon), 17.82 ft. (Propyleion), etc. occur as sufficient, both constructed of common l limestone as well as of marble. The possibility of a stone ceiling then existed in case of the given widths of centre aisles, even though I may doubt its use.

A passage of Pausanias in reference to the Heraion in Olympia gives some points in regard to the arrangement of the ceiling and the roof.

During repairs made to the latter, "the corpse of a heavy-armed soldier was found between the two ceilings, one of which was for ornament, the other for supporting the roof." It results from this, that a decorative horizontal ceiling covered the cell, amd an empty space existed between this and the pediment roof. In the construction of the closed ornamental ceiling, transverse beams were probably first placed at fixed intervals, then crossed at right angles by longitudinal beams lying on them, the interspaces being again divided in panels by short beams and closed by board panels above.

Coverings with variously painted terra cotta enclosed the beams on three sides like cases, or with noble metals and paintings may the effect of splendor have been produced on these decorative ceilings. Pausanias mentions in Athens " "chapels with gilded ceilings, decorated by alabaster and

ceiling; wooden beams and calyxcapitals are mortised in the lower and second week.

Above the entablatures of the ends rise the pediments terminating the gable roof, and whose tympany exactly follows the line of the roof. For the pediment walls constructed of shelly limestone are horizontally corbed and roofed together, like those of the cell. Since the front surface was greater than that of the cella, the pediment walls had to be [illegible] ing. The pediment course of stone ended horizontally to receive the pediment acroteria (Parthenon, Theseion, Paestum and the Sicilian temples), which was dove-tailed into the inclined coping stones, but at the same time rested on the corbed [illegible]. The entire inside [illegible] pediment masonry was covered by marble slabs, that extended with through vertical joints from the bottom to the inclined cornice, omitting horizontal joints, and was clamped to them. [illegible] Parthenon and Theseion.

[illegible] face was set back from the true vertical plane of the entablatures, as well as to reduce the width of the pediment.

[illegible] horizontal pediment cornice was surrounded a plain step as a [illegible] in the old Temple of Athena (Heretemenos) on the acropolis of Athens.— "where the [illegible] of Jotions stood on a special [illegible] on the Parthenon.

Note 1. See Th. Bissonet's beautiful and model publication [illegible] Berlin. 1904.

The temple roof (astoma) forms the external protecting covering of the building: constructed as a low gable roof, its [illegible] roof surfaces intersect on the ridge line of the structure and conduct the rain water toward the gables. He indeed to longer possess any direct note on the construction of the [illegible] of the roof, since from the peripheral nature of the [illegible] of which it was composed, no remains

paintings;" wooden beams and calymmatias are mentioned in the era of the Diadochides as entirely gilded and ornamented by ivory and mosaic work.

Above the entablatures of the ends rise the pediments terminating the gable roof, and whose masonry exactly follows the line of the roof. For the pediment walls constructed of shelly limestone are horizontally coursed and bonded together, like those of the cell. Since the front surface was plastered, it was not necessary to devote any special care to the jointing. The uppermost course of stone ended horizontally to receive the pediment acroteria (Parthenon, Theseion, Paestum and the Sicilian temples), which was dove-tailed into the inclined coping stones, but at the same time rested on the course beneath. For marble temples (Parthenon, Theseion), the pediment masonry was covered by marble slabs, that extended with through vertical joints from the bottom to the inclined cornice, omitting horizontal joints, and was clamped to that. (Figs. 163, 164. Egesta, Parthenon and Egina).

If figure decoration in the tympanum was foreseen, then its face was set back from the true vertical plane of the entablature in order to secure more space for the setting of the figures, as well as to reduce the weight of the pediment.

On the Temple of Concord at Akragas (Fig. 165), above the horizontal pediment cornice was arranged a plain step as a plinth for the figure decoration; a design that had its model in the old Temple of Athena (Hekatompedon) on the acropolis of Athens,-- "where the group of Tritons stood on a special base 8.66 ins. high. [1] This base for figures is again abandoned on the Parthenon.

*Note 1. See Th. Wiegand's beautiful and model publication: Archaische Porosarchitekturen der Akropolis zu Athen. p. 23, 152. Berlin. 1904.*

The temple roof (aetoma) forms the external protecting covering of the building; constructed as a low gable roof, its two roof surfaces intersect on the middle line of the structure and conduct the rain water toward the sides. We indeed no longer possess any direct data on the construction of the framework of the roof, since from the perishable nature of the wood and materials of which it was composed, no remains

at all are preserved to us; yet we can decide on its original
form with considerable reliability from the remaining evidence
served, from the holes cut in the stone courses of different
ent, and from ancient descriptions.

The geometry of our Greek Sanctuary is largely ver-
ers and of purlins parallel to the eaves; the purlins could
then rest on the cedarwood walls and also on the transverse
beams of the frontispiece and pronaos, which were natural wooden
brackets up to the ceiling, as we shall be able to see
called Lemnia of Concordia in Agrigento, an opening at the mid-
die of this upper wall made possible unrestricted access the-
reto. Also the rafters might rest directly on the longitudi-
nal walls of the cella, carried up to the roof ridge, as in
torf restored Temple E at Selinus, for example.

Jet-le-Duc and also by Hittorf for another temple, and that
has always been used in the south until the present time, may
have lingering origins.

In Phigaleia were assumed a ridge purlin (compare also the
were directly laid on the upper surfaces of inclined rafters.
on these lay the rafters resting against each other at top,
cut in dovetail form at the lower ends and resting in gains
out in the geison.

The rafters were placed about 2.08 ft. between centres; the
height of the roof in most temples amounted to between 1/7
and 1/5 the width of the gable measured above the cornice.
Since the rafters did not extend down over the geison, the
terminations of the roof must either be rested on this from
the cornice of the architrave, or as Lysicrates did it, and also Ikta
caused in front in the form of an open moulding. It overlays
the ridge pole (the ridge pole, half-vera on the inside) (ceiling)
the ridge pole, the ridge pole rested on them.

Furthermore, it may be most reasonable that the ceiling
the gable end (ridge pole) beneath. Vitruv. directed the ceiling

at all are preserved to us; yet we can decide on its original form with tolerable certainty from the covering materials preserved, from the holes cut in the stone cornices of different temples, and from building contracts.

The framework of the roof was constructed of inclined rafters and of purlins parallel to the eaves; the purlins could then rest on the pediment walls and also on the transverse walls of the pronaos and posticum, which were indeed usually extended up to the rafters, as may still be seen on the so-called Temple of Concordia in Akragas, An opening at the middle of this upper wall made possible unrestricted access thereto. Also the rafters might rest directly on the longitudinal walls of the cell, carried up to the roof surface, as Hittorf restored Temple R at Selinus, for example.

A construction with horizontal rafters, as assumed by Viollet-le-Duc and also by Hittorf for another temple, and that has always been used in the south until the present time, may have likewise existed.

Sheathing seems to have never been used; the tiles were then either hung on horizontal purlins by their projections, or were directly laid on the upper surfaces of inclined rafters.

In Phigaleia were assumed a ridge purlin (compare also the roof of the north portico of the Erectheion) and two intermediate purlins, that rested on the different pediment walls; on these lay the rafters resting against each other at top, cut in dovetail form at the lower ends and resting in gains cut in the geison.

The rafters were placed about 2.08 ft. between centres; the height of the roof in most temples amounted to between 1/7 and 1/8 the width of the temple measured above the architrave.

Since the rafters did not extend down over the geison, the inclination of the roof must either be worked on this from the ends of the rafters outward, or as frequently the case, a separate inclined piece must be laid on it, and which then ended in front in the form of an ogee moulding. If cymatiums extended along the sides, they were on the inclined pieces; in other cases the roof tiles rested on them.

Interesting points on roof construction are given by various ancient building contracts, which indeed do not primarily

apply to the roofs of temples, but to those of secular buildings. Here is again the previously mentioned building con-
[illegible]
question runs thus:-- [1] (See Greek text in Burn).

Note 1. Corpus Inscrip. Attic. II. 2. No 1054. Berlin. 1883.
Translated into German and thence into English:--

"Set capitals of Pentelican stone on the piers. On these rest wooden architraves, which are fastened to the pieces and are 2.5 ft. wide and 2.85 ft. high, measured from the highest point, 13 in number on each side. (The architraves, which are regarded as purlins, are dressed off on top to the slope of the roof). Place intermediate beams over the middle passage on the piers, equal to the architraves in thickness and height. On these lie longitudinal beams (here ridge purlins) 1.75 ft. wide and 1.75 ft. high, exclusive of bevelling, upper which are wooden caps 2 ft. long and 1.5 ft. thick. The purlins are to be fastened with pins on these and on the intermediate beams. On these rest the rafters (epenkiskoi) 0.55 ft. high and 0.55 ft. [illegible] are to be boards (calyptra) 0.06 ft. thick and 0.25 ft. wide, fastened by iron nails; after these are placed (dorsses, with clay and straw), the roof will be covered with Corinthian tiles, one tile looking over another." [1]

[illegible]

of the sheathing of the roof (with clay and straw). "Pier" is preferable to "column". The restoration of the section is a [illegible]

[illegible]

clined rafters, and that in the three-sided interior the vertical supports of the square were stone piers, that the arrangement of a ridge purlin resting on a wooden cap and the [illegible]

feet of the rafters did not rest on a plate, but were let directly into the sockets of the cornice; further that on the rafters was laid a sheathing coated with clay, on which the clay tiles were set. (Brit. 1885; after Penrose's restoration).

[illegible]

apply to the roofs of temples, but to those of secular buildings. Here is again the previously mentioned building contract for the Arsenal of Philo. (Lines 45-58). The passage in question runs thus:-- [1] (See Greek text in Durm).

*Note 1. Corpus Inscrib. Attic. II. 2. No 1054. Berlin. 1883.*

Translated into German and thence into English:--

"Set capitals of Pentelican stone on the piers. On these rest wooden architraves, which are fastened to the pieces and are 2.5 ft. wide and 2.25 ft. high, measured from the highest point, 18 in number on each side. (The architraves, which are regarded as purlins, are dressed off on top to the slope of the roof). Place intermediate beams over the middle passage on the piers, equal to the architraves in thickness and height. On these lie longitudinal beams (here ridge purlins) 1.75 ft. wide and 1.75 ft. high, exclusive of beveling, under which are wooden caps 3 ft. long and 1.5 ft. thick. The purlins are to be fastened with pins on these and on the intermediate beams. On these rest the rafters (sphekiskoi) 0.63 ft. high and 0.94 ft. wide, at distances of 1.25 ft. apart; lastly, on these are to be boards (calymata) 0.06 ft. thick and 0.38 ft. wide, fastened by iron nails; after these are coated (dorosas, with clay and straw), the roof will be covered with Corinthian tiles, one tile looking over another." [1]

*Note 1. Bohn's translation (Cent.d.Bauw. 1882. p. 295.296) omits some important words, especially "dorosas", the covering of the sheathing of the roof (with clay and straw). "Pier is preferable to "column". The restoration of the section is n neither satisfactory nor acceptable.*

We deduce from this, that the roof was constructed with inclined rafters, and that in the three-aisled interior the vertical supports of the purlins were stone piers, that the arrangement of a ridge purlin resting on a wooden cap and the strong transverse beam beneath this was chosen, and that the feet of the rafters did not rest on a plate, but were let directly into the ashlars of the cornice; further that on the rafters was laid a sheathing coated with clay, on which the clay tiles were set. (Fig. 166; after Choisy's restoration).

*Note 1. With the restoration by Choisy, that published by Fabricius mostly agrees. (Die Skenothek des Philon, das Zeug-*

Zeughaus des Attischen Marine in Pei. Hermes. Zeits. f. Class. [illegible] tion of the text, which Fabricius gives in his essay, will be read by every practician with pleasure. Except that the surprising statement is made (p. 583): "It is well known that no other mode of fastening the tiles, especially that by nails on the rafters, occurred in antiquity," -- while yet the [illegible]

[illegible] of the Athenian walls[2](Corp. Insc. Attic. II. 1. No. 167), which Choisy[3](in his Study:- Les Murs d'Athenes. Paris. 1884), treats in a truly ingenious but not entirely satisfactory manner. He takes up the matter as too beautiful and too artistic, when it concerns the repairs to a fortification, that has fallen. Therefore his translation and interpretation of the lines 63-73 do not correspond verbatim to the Greek. As for the top of the wooden ceiling (Fig. 167), he may be followed, [illegible] ted, that the pier must be carried to the same height as the [illegible] is not specified. But in the passage (see original text in Durm) occurs an interpretation, which it is still harder to accept. He arranges work, that can only be performed after that described later has been completed. He first requires on the rafters of the ceiling or roof a superstructure of un- [illegible] the supporting sheathing and the beams to prevent sliding. But the addition of the rather modern, bomb-proof, mass of earth (E in Fig. 167) above the woodwork of the ceiling is not mentioned in the specification, and this work is so great and so important, that one would not have forgotten to mention it. Choisy assumes all succeeding work to be on both sides, but nothing of this likewise remains in the building contract. [illegible] ment in the letting of work.

---

[illegible]

*Zeughaus des Attischen Marine in Zea. Hermes. Zeits. f. Class. Phil. 1882. p. 551-594). The clear and excellent interpretation of the text, which Fabricius gives in his essay, will be read by every practician with pleasure. Except that the surprising statement is made (p. 582); "It is well known that no other mode of fastening the tiles, especially that by nails on the rafters, occurred in antiquity," -- while yet the Lex Puteolana expressly requires the nailing of one row of tiles with iron nails.*

Less clear is the case in the contract for the restoration of the Athenian walls[2](Corp. Insc. Attic. II. 1. No. 167), Which Choisy[3](in his Study:- Les Murs d'Athenes. Paris. 1884), treats in a truly ingenious but not entirely satisfactory manner. He takes up the matter as too beautiful and too artistic, when it concerns the repairs to a fortification, that has fallen. Therefore his translation and interpretation of the lines 63-73 do not correspond verbatim to the Greek. As for the top of the wooden ceiling (Fig. 167), he may be followed, though not without objection, since it is not definitely stated, that the pier must be carried to the same height as the wall, and a projection of the beams beyond the wall and piers is not specified. But in the passage (see original text in Durm) occurs an interpretation, which it is still harder to accept. He arranges work, that can only be performed after that described later has been completed. He first requires on the beams of the ceiling or roof a superstructure of unburnt bricks or pise, and after this the substructure, i.e. the supporting sheathing and the beams to prevent sliding. But the addition of the rather modern, bomb-proof, mass of earth (M in Fig. 167) above the woodwork of the ceiling is not mentioned in the specification, and this work is so great and so important, that one would not have forgotten to mention it. Choisy assumes all succeeding work to be on both sides, but nothing of this likewise remains in the building contract. This double work would not have been omitted by a Greek in the letting of work.

*Note 2. See Corp. Inscr. Attic. II. 1. No. 167.*

*Note 3. In his Study:- Les Murs d'Athenes. Paris. 1884.*

C. O. Müller assumes a shed roof instead of Choisy's gable

roof, and longitudinal beams from eier to pter instead of the [illegible] according to our opinion. The passage cited reads as follows, literally translated:--

- - - "Pter he has made ready the wooden framework of the ceiling, he will set on the wall the straight geison of the cornice, projecting sideways 1.5 ft., and will set on this the upper piece of the cornice (akroderion), true and plumb, 7 ins. wide 1 palm (handbreadth or 4 fingers = 8.8 cms.) thick, while he cuts out on the inner side the thickness of a board and 6 dressers off the top in accordance with the slope of the roof. He will lay on the inside beams 1 in. thick and 5 ins. wide with intervals of 3 palms (10.5 ins.), and (fasten them) with iron nails. And after he has thrown upon them plastering reeds (for reeds, the canes of the Italians) with an under layer of chaff (pieces of reeds or chopped straw) or reeds, he will cover this with straw to the thickness of 3 ins. And he will cover the entire extent of the enclosing walls with Laconian tiles, and he will set the pegwomen, where they are wanting, entirely in clay, fixed with the face of the wall.

And he will mould the outside with a Corinthian cymatium.

In the non derective inscription is also mentioned a coating [illegible] Choisy's drawing could scarcely be derived from the tile roof without rafters, which is likewise followed by [illegible] which contain the "ἐπόσοι κανὲ κεκαμμένο" --the covering of the sheathing with clay and straw and the bedding of the tiles in this.

[illegible] reference to the partition of the city walls of Athens[1] by [illegible] was roofed above and along the ceiling beams projecting above the face of the wall, which, after the slope of the roof

roof, and longitudinal beams from pier to pier instead of the transverse beams, which corresponds better to the conditions, according to our opinion. The passage cited reads as follows, plainly translated:--

- - - "After he has made ready the wooden framework of the ceiling, he will set on the wall the straight geison of the cornice, projecting sidewise 1.5 ft., and will set on this the upper piece of the cornice (akrogeison), true and plumb, 7 ins. wide 1 palm (handbreadth or 4 fingers = 3.5 ins.) thick, while he cuts out on the inner side the thickness of a board and d dresses off the top in accordance with the slope of the roof. He will lay on the inside boards 1 in. thick and 5 ins. wide with intervals of 3 palms (10.5 ins.), and (fasten them) with iron nails. And after he has thrown upon them plastering reeds (dry reeds, the canna of the Italians) with an under layer of chaff (pieces of reeds or chopped straw) or reeds, he will cover this with straw to the thickness of 3 ins. And he will cover the entire extent of the enclosing walls with Laconian tiles, and he will set the hegemones, where they are wanting, entirely in clay, flush with the face of the wall. And he will set the covering tiles entirely on a bed of clay.

And he will mould the outside with a Corinthian cymatium, while he trims off the ends of the beams properly, and sets the former exactly in the plane (of the Wall) and plumb---."

In the now defective inscription is also mentioned a coating with clay and straw, though this work does not appear in the details. Choisy's drawing could scarcely be derived from this, and we are then poorer by oni idea in construction, by the tile roof without rafters, which is likewise followed by Dieulafoy, and has its result in the convex clay and straw roof of the early period (Francois vase). But here is likewise certain the "δρρωσει πηλω ηχυρωμενο" --the covering of the sheathing with clay and straw and the bedding of the tiles in this.

If the interpretation of the very defective inscription in reference to the rebuilding of the city walls of Athens [1] by Choisy [2] be correct, a longitudinal timber (N) of fixed height was required above and along the ceiling beams projecting along the face of the wall, which, after the slope of the roof

ed on in form of a gable roof or of subsent bricks (M. Fig. 1[illegible]). The gable roof of pies occurs here instead of the flat or low domed clay roof, while the precautions against sliding of the mass of earth remain the same.

[illegible]

[illegible]

I re Ernst; les Mere s'Atenes d'après le devis de leur restauration. [illegible]

It is in this structure of the last years of the 4 th century B.C. (305-304) an ancient construction of the cornice is imitated, and it has not rather resulted from the peculiar purpose of the building, the ground form of the translation into stone would be found, although not for decoration, for which all data are lacking.

[illegible] reeds found in Olympia (Fig. 1[illegible]) shows us how the basal form is to be best separate from the ornamental form. For this use [illegible] as tacking for ends of ceiling beams affords additional information in reference to the description of the work for the Athenian walls.

But if we assume the roof with rafters to be a later advance, instead of the clay roof, then must the ground form of the later stone cornice be derived from the combination of beams and ends of rafters, as indicated by the Temple of Concordia [illegible]. [illegible] may be regarded as corresponding to the continuous tree board or the ends of the rafters (with or without a terra cotta covering of the board), the mutules or vise to the under sides of the projecting rafters, reserved and ornamented small boards, that protected the out-off ends of the beams.

[illegible] are proved by finds and by the evidence of the building contract for the city walls of Athens.[1]

had been formed, had to prevent the slipping of the pise piled up in form of a gable roof or of unburnt bricks (M, Fig. 167). The gable roof of pise occurs here instead of the flat or low domed clay roof, while the precautions against sliding of the mass of earth remain the same.

*Note 2. Discovered in 1829. See Bull.d.Inst. Arch. March 1835; -- also see Müller, C.O. De monumentis Athenarum etc. Göttingen. 1836.*

*Note 3. In Etudes epigraphiques sur l'Architecture Grecque I re Etude; les Murs d'Athenes d'apres le devis de leur restauration. Paris. 1888. Sect. 60-65.*

If in this structure of the last years of the 4 th century B.C. (306-308) an ancient construction of the cornice is imitated, and it has not rather resulted from the peculiar purpose of the building, the ground form of the translation into stone would be found, although not for decoration, for which all data are lacking.

The angle block of the cornice of the Treasury of the Megareans found in Olympia (Fig. 168) shows us how the basal form is to be kept separate from the ornamental form. For the use of the often very rich and beautifully decorated front protecting tiles as facings for ends of ceiling beams affords additional information in reference to the description of the work for the Athenian walls, which is also stated in the succeeding vo. But if we assume the roof with rafters to be a later advance, instead of the clay roof, then must the ground form of the later stone cornice be derived from the combination of beams and pairs of rafters, as indicated by the Temple of Concordia in Akragas in Fig. 169. Then the front surface of the geison may be regarded as corresponding to the continuous face board of the ends of the rafters (with or without a terra cotta covering of the board), the mutules or viae to the under sides of the projecting rafters, inserted and ornamented small boards, and the narrow vertical band, to the continuous covering strip, that protected the cut-off ends of the beams.

Terra cotta coverings and their fastenings on roof cornices are proved by finds and by the evidence of the building contract for the city walls of Athens. [1]

*Note 1. See Die Fude von Olympia. Edition in one volume etc.*

seams of the deison of shell concrete, which had a groove set back on the top and iron pins in the front surface. The block examined at the locality be me (1880) still retained o projecting iron pins at distances of 7.1 and 15.7 ins., slightly projecting from the surface and occupying the middle of the front side. The inclined upper surface of the stone was covered by thin red stucco. In the 41 st Fragment zur Wissenschaftlichen Kunst pins are mentioned, but on the front and upper surfaces of the stone.

Lines were found after the discoveries in Olympia. According to my sketches made in March, 1884, these sabiere here a length of 3.94 to 6.09 ft. and more, a width averaging 2.89 ft., and a thickness of 1.57 ft. and more, according to whether t the upper surface is dressed off more or less roughly. A border on this is cut better for 10.2 to 15.9 ins. from the front face, and the front surface is more carefully dressed. The border is some 0.20 to 0.78 inch. Bronze and iron pins remain in this at distances of 7.25 to 7.86 ins. from the front edge. Not all of the existing blocks have at this time these pins. (Kive belonging to the north side and one block of the south side have fallen into the cell). Many are free of them and t bear no mark of anything of the kind. Angle blocks were not observed; even the pediment deison has disappeared. Some of

*p. 36-38, Pls. 38-40. Berlin. 1882. Also Programm zum Winckelmannsfeste d. Arch. Gesell. z. Berlin. 1881. The decision of Fenger (Dorische Polychromie etc., p. 19. Berlin. 1886) in reference to covered woodwork has meanwhile been corrected to accord with the facts. His rather perplexing text appears to substantially repeat the views of German masters, gratitude to them being expressed in a preface. On account of the copper nails in Metapontum, the law (in 41 st Programm z. Winckelmannsfeste d. Arch. Gesell6 z. Berlin, p. 11. Berlin. 1881) that the terra cotta boxes are to be regarded as facing pieces for the geison, is no longer tenable.*

In the ruins of the Treasury of the Geloans were found fragments of the geison of shell conglomerate, which had a groove set back on the top and iron pins in the front surface. The block examined at the locality be me (1890) still retained p projecting iron pins at distances of 7.1 and 15.7 ins., slightly projecting from the surface and occupying the middle of the front side. The inclined under surface of the stone was covered by thin red stucco. In the 41 st Programm zum Winckelmannsfeste iron pins are mentioned, but on the front and upper surfaces of the stone.

In the ashlars for receiving the rafters of Temple C in Selinus were found after the discoveries in Olympia. According to my sketches made in March, 1884, these ashlars have a length of 3.94 to 6.09 ft. and more, a width averaging 2.89 ft., and a thickness of 1.57 ft. and more, according to whether t the upper surface is dressed off more or less roughly. A border on this is cut better for 10.2 to 18.9 ins. from the front face, and the front surface is more carefully dressed. The border is sunk 0.20 to 0.79 inch. Bronze and iron pins remain in this at distances of 7.28 to 7.88 ins. from the front edge. Not all of the existing blocks have at this time these pins. (Five belonging to the north side and one block of the south side have fallen into the cell). Many are free of them and b bear no mark of anything of the kind. Angle blocks were not preserved; even the pediment geison has disappeared. Some of the pins are at the junction of the border and the rough upper surface; the distances between the pins and pin holes do not correspond to the gains for the rafters, and they are also

not repeated at regular distances (Fig. 170).

These arrangements on the coarse stones are rightly referred to fragments of another material, and such fragments of painted terra cotta were first found in Olympia and made credible by Dörpfeld and his associates. The box shaped fragments found by them and their fastenings must have accurately fitted the iron pins in the stone in regard to dimensions and distances.

Some of the terra cottas found at Temple O in Selinus and exhibited in 1894 in the Museum at Palermo shows nail holes in the unpainted side; they are much rather found on the rough surface decorated by a band. Likewise none have been completely preserved, that their ends can be distinctly given. [illegible] at other places with different peculiarities.

After the description and discussions, one can no longer doubt the use of terra cotta on stone.[1]

[illegible] Berlin. 1891.

Scarcely any different impression exists concerning the use and arrangement of painted terra cotta cymatiums with the notable height of 1.54 ft. and more. They were employed at Selinus, Syracuse, Gela, Metapontum, Olympia, etc., and they extend along the pediment cornice as a crowning member and along the sides of the temple area great gutter for water, as already shown by Dittorf. These must in time have given way to t[illegible] traces of hard, fine-grained limestone, as shown by examination [illegible] Kiesow, [illegible] dressed to from 3.46 to 3.88 or even 3.54 ft.

In [illegible] tone cymatiums are faithful copies of the older terra cotta cymatiums; they also exhibit to us the mode of connection with the roof tiles and the careful and joining of the pieces by overlapping grooves, the addition of small metal cramps and the [illegible] the sine joints by hollow tiles, which extend nearly to the [illegible] Die [illegible] 1.2. [illegible]

not repeated at regular distances (Fig. 170).

These arrangements on the cornice stones are rightly referred to facings of another material, and such facings of painted terra cotta were first found in Olympia and made credible by Dörpfeld and his associates. The box shaped facings found by them and their fastenings must have accurately fitted the iron pins in the stone in regard to dimensions and distances.

None of the terra cottas found at Temple C in Selinus and exhibited in 1884 in the Museum at Palermo shows nail holes in the unpainted side; they are much rather found on the front surface decorated by a band. Likewise none have been so completely preserved, that their ends can be difinitely given. Yet it is not impossible that other pieces existed or yet exist at other places with different peculiarities.

After the descriptions and discussions, one can no longer doubt the use of terra cotta on stone. [1]

*Note 1. On the other hand, see Hauser's Conference in the 41 st Programm z. Winckelmannsfeste der Arch Ges. zu Berlin. Berlin. 1881.*

Scarcely any different impression exists concerning the use and arrangement of painted terra cotta cymatiums with the notable heights of 1.64 ft. and more. They were employed at Selinus, Syracuse, Gela, Metapontum, Olympia, etc., and they extend along the pediment cornice as a crowning member and along the sides of the temple as a great gutter for water, as already shown by Hittorf. These must in time have given way to t those of hard, fine-grained limestone, as shown by examples from Selinus, Himera, and Akragas, whose heights are then increased to from 2.46 to 2.63 or even 2.69 ft.

In regard to profile, ornamentation and color, these limestone cymatiums are faithful copies of the older terra cotta cymatiums; they also exhibit to us the mode of connection with the roof tiles and the careful end jointing of the pieces by overlapping grooves, the addition of small metal cramps and the introduction of grout mortar, as well as the covering of the side joints by hollow tiles, which extend nearly to the rear side of the cymatium. The gutters, i.e., the width of the channel for water, remain relatively narrow, for they measure only 6.3 to 7.1 ins. in Himera and Akragas. the water

was led from the collecting cisterns through the so-called
"spouts", which were shaped like projecting rectangular chan-
nels, as widely opened lions' jaws, or like trumpet mouths.
On Hellenistic structures the cymas are recessed moderately
in height, accused on the front by small ornaments and lion's
masks. The water channel is cut in the stone cyma, usually of
shallow depth. The lions' heads are perforated for discharg-
ing the rain water.(Fig. 171). These were evidently only re-
quired on the eaves. Tubular mouth-pieces for spouts have
already long since been found on marble cymatiums in Athens,
and similar ones of terra cotta in Olympia and also by Gavai-
lari in Sellinus. The piece exhibits complete harmony with
those found in Olympia, is preserved in the Museum in Palermo,
and was published by Cavallari in 1882. (Cave di Selinunte,
Cavallari Hall'anno 1882). A piece of a box in the Museum at
Syracuse--exhibiting the antifixes of such a mouth-piece on
the front of a painted terra cotta water gutter.

The large Ionic Gay Dorchard temple at Selinus (7.7" ins.
wide) on the Temple in Himera was led to one spout, which o-
cupies at the smallest section is 2.75 ins. high and 4.77 ins.
wide. On the small Treasury of the Geloans, two spouts were
[illegible] in a row on the [illegible] side, and [illegible]
sections are 1.37 ins. diameter. A cymatium, found in Agra-
gas exhibits an outlet opening 2.35 ins. high with a width
of 1.88 ins., and those on the Athenian cymatium are only
0.98 in., thus all have rather small sections. The number
of spouts must increase the disadvantages by their small sec-
tions, and the cymatiums are 1.64 to 3.16 ft. high and prove-
[illegible]

The pieces of the cymatium also frequently had exactly the
width of the gutter tiles, and their sides were built up like
those, which were covered as far as possible by cover tiles.
[illegible] conice detailed descriptions of the rosettes on the brow ora-
ments, and which were also features in even the lowest per-
ron (corona Pomeri), and even then received improvements.
A spout was there for each row of tiles, so that the cymatium
[illegible]

was led from the collecting gutters through the so-called spouts, which were shaped like projecting rectangular channels, as widely opened lions' jaws, or like trumpet mouths. On Hellenistic structures the cymas are recessed moderately in height, adorned on the front by small ornaments and lion's heads. The water channel is cut in the stone cyma, mostly of shallow depth. The lions' heads are perforated for discharging the rain water.(Fig. 171). These were evidently only required on the eaves. Tubular mouth-pieces for spouts have already long since been found on marble cymatiums in Athens, and similar ones of terra cotta in Olympia and also by Gavallari in Selinus. The piece exhibits complete harmony with those found in Olympia, is preserved in the Museum in Palermo, and was published by Gavallari in 1882. (Scave di Selinunte, eseguiti nell'anno 1882). A piece of a box in the Museum at Castelvetrano exhibits the addition of such a mouth-piece to the front of a painted terra cotta water gutter.

The water from two vertical rows of tiles (together 3.7 ft. wide) on the Temple in Himera was led to one spout, whose opening at the smallest section is 2.75 ins. high and 4.72 ins. wide. On the small Treasury of the Geloans, two spouts were assigned to a row of tiles 1.9 ft. wide, and whose circular sections are 1.57 ins. diameter. A cymatium, found in Akragas exhibits an outlet opening 2.36 ins. high with a width of not even 0.79 in.; the tubes from Selinus have a diameter of 1.38 ins., and those on the Athenian cymatium are only 0.98 in., thus all have rather small sections. The number of spouts must increase the disadvantages by their small sections, and the cymatiums are 1.64 to 2.46 ft. high and prevent the water from running over.

The pieces of the cymatium also frequently had exactly the width of the gutter tiles, and their sides were bent up like those, which were covered as far as possible by cover tiles, an arrangement that probably proved better, like all the ingenious detailed descriptions of the rebates on the high cymatiums, and which were also retained in even the latest period (compare Pompeii), and evin then received improvements. A spout was there for each row of tiles, so that the cymatium could be lower and the outlets remain small. The remains of

operations in Peloponnesian to this close.

not have gutters for water.(Gymnasium). The water fall freely from the lowest range of tiles, or in windy weather ran down over the face of the season to its drip and then fell to the ground. Instead of the decorated overhang along the long sides, we find the ornaments of the antefixes in use, sometimes combined with the [illegible] decorations.(compare Parthenon). This was at all events the older arrangement, the termination of the lowest cover tile [illegible] suggested, has a technical basis, and affords an effective ornamentation of the upper horizontal line without further trouble. But the combined or united antefixa ornaments must be just as ancient, which is solid with the lower flat tiles of the roof and conceal behind themselves the cover tiles of the lowest range. (fig. 172).

[illegible] flat tiles with a front facing and curved edges at the sides, i.e., are one with them. Corresponding to the other flat tiles of the roof, they were 2.42 ft. wide and were indeed applied on the rafters like gutter tiles.(Compare Lex Puteolana. [illegible] lowest range of tiles).[1] While the antheniens are mostly well preserved, the flat tile portion belonging to them only remains in in short pieces about 0.70 ft. long. Their original form therefore cannot be entirely determined. The water from the roof surface escaped through places left open in the interstices. The painting of the front facing of the antheniens outer tiles clearly indicates their projection beyond the corner members behind, as this was everywhere usual with the ordinary outer tiles. Nothing surprising can be found in the flowing of the water between the antheniens, since the same likewise occurred on the Athenian buildings, -- certainly with larger openings.

[illegible]

cymatiums in Metapont belong to this class.

As before stated, the buildings of Pericles in Athens did not have gutters for water.(Cymatiums). The water fell freely from the lowest range of tiles, or in windy weather ran down over the face of the geison to its drip and then fell to the ground. Instead of the decorated cymatium along the long sides, we find the ornaments of the antefixas in use, sometimes ranging with the cover tiles, sometimes only placed as d decorations.(Compare Parthenon). This was at all events the older arrangement, the termination of the lowest cover tile by a flat surface or an ornament placed before it is readily suggested, has a technical basis, and affords an effective ornamentation of the upper horizontal line without further trouble. But the combined or united antafixa ornaments must be just as ancient, which is solid with the lower flat tiles of the roof and conceal behind themselves the cover tiles of the lowest range. (Fig. 172).

The interlaced and painted terra cotta anthemions, nominally found in greater number at Temple C in Selinus, stand on flat tiles with a front facing and curved edges at the sides, i.e., are one with them. Corresponding to the other flat tiles of the roof, they were 2.46 ft. wide and were indeed nailed on the rafters like gutter tiles.(Compare Lex Puteolana. Corp. Lat. Inscr. No. 577, which requires the nailing of the lowest range of tiles).[1] While the anthemions are mostly well preserved, the flat tile portion belonging to them only remain in short pieces about 0.70 ft. long. Their original form therefore cannot be entirely determined. The water from the roof surface escaped through places left open in the interlacings. The painting of the front facing of the anthemion gutter tiles clearly indicates their projection beyond the cornice members beneath, as this was everywhere usual with the ordinary gutter tiles. Nothing surprising can be found in t the flowing of the water between the anthemions, since the same likewise occurred on the Athenian buildings, -- certainly with larger openings.

*Note 1. In parenthesis above.*

Selinus does not remain as the sole example of this. A fragment in the Museum at Metapont still more strikingly exhibits

the projection of the gutter tile decorated by anthemions. The round on the under side is painted in a single color and acts as a water drip; the under side is painted for a width of 3.94 ins. and shows a broken place beyond this, and it is therefore not improbable, that a vertical flange there extended downwards, as exhibited by another fragment of a painted tile preserved at Metapont, on which the projection for the anthemion exists, whose stem or base is ornamtented by a decorative projecting lion's head. It may then be permissible to regard the piece in question as the gutter cornice tile of a projection with rafters, where the bases decorated in relief covered the front ends of the rafters, or the strip fastened before them. (Compare the

The ancient constructions of the roof, which are imitated on an Etruscan urn for ashes (Museum in Florence) and on Grecian reliefs (Museum in Naples), partly exhibit overhanging pairs of rafters. A painted fragment of a tile in the Museum at Syracuse also by its form admits of the conclusion of a similar purpose; only the anthemion is not set back there, but is in the same plane with the facing flange. Projections affording protection also appear on the known gutter tiles of Olympia with the undercutting like a water drip, and the gutter tile of Aegion published by Hittorf[1](Pl. 83). Other fine examples also lie on the Acropolis and in the Theatre of Dionysos at Athens, a representation of which is given in Fig.173. An example of a gutter tile with "kalypt" and antefixa wrought on it is found in Fig. 173, of the kind frequently found in Olympia, executed in larger and smaller dimensions. The older terra cotta cymatium pieces (Treasury of the Geloans, Syracuse) mostly exhibit the form of the Egyptian cavetto cornice, while another (indeed later) group has flat surfaces with a cymatium moulding at top. [1] Pieces have also been recently found by the excavations in Pompeii, which are similar to those described. [2]

*Note 1. Hittorf. Plate 83.*

*Note 1. Puchstein. p. 52, 53.*

*Note 2. Duhn & Jacobi. Der Griechische Tempel in Pompeii. Plates 6, 7. Heidelberg. 1890.*

The terra cotta finds at Temple C in Selinus have given op-

opportunity for the restoration of the corresponding principal cornice, which has on the part of the Germans been published by Dörpfeld,[3] and on the part of the Italians by Cavallari.[4] We reproduce in Figs. 174 and 175 the efforts of both, with the remark, that according to Cavallari, the cornice of the temple would have appeared somewhat high, except that the beautiful crowning anthemion of the gutter tiles, when seen from below, would disappear or its effect would be lost with the observer at a considerable distance. No evidence exists for the addition of the selected cymatium with the trumpet-shaped spouts, and holes through the ashlars supporting the rafters are not found. Moreover, no artisan would permit such eccentricities in the removal of the water. Excepting the doubtful upper ending of the gutter tiles and their fastening to the stone, Dörpfeld' attempt should be accepted as correct.[5]

*Note 3. In 41 st Programme z. Winckelmannsfeste. d. Arch. Gesell. z. Berlin. Pl. 2. Berlin. 1881.*

*Note 4. In Notizie degli Scavi. 1882. Pl. 19.*

*Note 5. In regard to colored terra cottas see:--*

*Durm, J. Konstruktive und polychrome Details der griechischen Baukunst. Taf. 10. Berlin. 1880.*

*Hittorf, J. J. L'architecture polychrome chez les Grecs. Taf. 6, 7, 10, 13. Paris. 1846.*

*Le Bas. Voyage archaeologique en Grece et en Asie mineure. Taf. II, 1, II, 2. Paris. 1848.*

*Semper, G. Der Stil in den technischen und tektonischen Künsten usw. Frankfurt-a-M. und München. 1860-63.*

*Rayet, O and M. Collignon. Histoire de la ceramique grecque. Pl. 15, 16. Paris. 1888.*

*Die Baudenkmäler von Olympia bearb. von F. Adler u.a.Text volume. For the horizontal terra cotta cornice of the pediment end of the Treasury of the Gelcans (Pl. X, 41) no attention is paid to the removal of water, and as drawn, this is impossible. R. Borrmann repeats the same arrangement in his "Keramix in der Baukunst." p. 86.*

With this terra cotta covering of the cornice and the formation of the margin of the gutter connected therewith, the m mode of covering the roof is closely connected.

The primitive covering of the roof was that of clay mixed

with straw, which was succeeded by that with burned tiles, e everywhere on the earlier temples; their form and the mode of covering was the same now common in southern countries; great flat tiles (imbrices) with upturned sides were laid beside e each other, and the joint was covered rain-tight by concave tiles(calypteres).

To the roof of clay tiles succeeded that of marble tiles; the parts and forms of the first being transferred to the latter.[1]

*Note 1. See 41 st Programm z. Winckelmannsfeste d. Arch. Ges. z. Berlin. p. 16-22. Berlin. 1881.*

As the oldest kind of clay tiles and their use may be regarded the flat curved bottom tiles with semicircular cowering tiles, that were laid just as mediaeval of now on the ordinary Italian roofs of concave tiles. Then along the gutter were employed flat tiles with water drips, that were more firmly held by nailing to the rafters.[2]

*Note 2. See Lex Puteolana.*

The dimensions of tiles varied between 1.31 and 1.64 ft. in width and in length from 2.62 to 3.60 ft. Their surfaces were frequently coated with a fine skin of finely pulverized clay and were left in the natural color tone of light yellowish-gray or reddish, or they were coated with a dark (blackish) glaze, as shown by examples from Olympia, Argos and Mycenae. For Epidauros is proved the tarring of the tiles.[3]

*Note 3. See Baunack, J. Aus Epidauros. p. 88. Leipzig. 1890. (Inscription Z. 239. "60 drachmas and 5 1-2 obcluses. (1 drachma ¾ 4.36 grains of silver).*

A flat curved tile of yellowish clay 1.67 ft. wide, 3.28 ft. long and 1.58 ins. thick, found at the Ceramicos in Athens, has two impressed stamps, the uppermost bearing the words "Solchos architekton." The light clay tone occurs on both the Grecian mother country as well as in the colonies on the finished articles.

Curved tiles were followed by flat tiles with upturned edges, whose jointings exhibit the most diverse forms. But with the occurrence of the flat tiles, the covering tiles also changed their form; they were more frequently burned in o one piece with the former.(Fig. 173, fragments from Athens a

[illegible] the [illegible] [illegible] [illegible]

and Olympia). The gabled form of the covering tiles had to give place to the semi-cylindrical, when the top was flat or curved, as shown by the different examples. A fragment of t the former is covered with slightly shining red clay, as shown by Samian vessels, while others exhibit a tone more like terra Siena and painted or relief decorations executed in color.

Broken tiles were considered worth mending, as shown by pieces held together by lead cramps in Athens. The so-called r riveted tiles were made known by Koldewey [1] for Assos, Olympia and Khorsabad.

*Note 1. Die antike Baureste der Insel Lesbos. p. 46. Berlin. 1890.*

Variations in manufacture are shown by some fragments of A Athenian marble tiles, whose surfaces for water are smoothly polished, their edges, joints and raised edges, together with the under surface being rough, where the edge margins bear setting marks in the form of letters, that are also similarly repeated on marble tiles in Epidauros.(Fig. 176). An Athenian marble tile manufactory is shown by a narrow band, on it being scratched a line, on this being two pin holes not extending entirely through.

In Ephesus were found at the Artemesion fragments of antique roof tiles (now preserved in the British Museum in London), one of which came from the temple burned earlier (358 B.C.), the other from the rebuilding commenced by Deinocrates, and which are furnished on the underside with the so-called hooks. On the fragment from the later temple, these nose-shaped hooks (8.54 ins wide, 2.95 ins. long and 0.98 in. high) are placed on the left upper corner, close to the edge and 0.59 in. distant from the upper margin. Since a second fragment of the right upper corner of another tile, now in London, has a hook at exactly the same place, the entire tile must have had two hooks at its top.[2]

*Note 2. See Puchstein in Woch. f. klass. Phil. 1890. page 1409-1410. What is there further said concerning this subject is not technically entirely clear. Borrmann remarks on it, that the Ephesian fragments prove "marble tiles with hooks, since these could only have been intended to rest on horizon-*

were made for both tile and marble roofs, of which examples of the most diverse kinds are preserved in Pompeii.(G. Boom. Bemerkt der Ettwicker und Römer. 2 nd edition. p.[illegible]. Stuttgart. 1[illegible]).

The tiles are alike covered by [illegible] tiles, [illegible] the sides of which were inserted the covering tiles, or a [illegible] and sides of which were [illegible] the ends of the covering tiles, or hollow and flat tiles were curved to the form of the roof and fastened on the ridge, so that the latter was protected in an excellent way. The c continuous hollow tiles were issued; the joints were often [illegible] (78).

A rich collection of Greek roof tiles, as well as those employed on valleys and hips, according to the treasures, as [illegible] in the great Museum [illegible] Athens, in Giarre (Sicily), as well as elsewhere at [illegible] of hipped valley tiles.

[illegible] the buildings.

Fragments of white marble tiles, that indeed belonged to t [illegible] are [illegible].

[illegible] vertex to the eave, when those in the vicinity (vertex) were cut from a single block, on account of the difficulty of joining. (Fig. 177, not before published). The covering tiles were present on the flat tiles, thus being in one piece with them, as made possible for the marble tiles in Ellesiera by von Stackelberg. I have not seen the originals of the latter myself, but have measured and sketched the pieces in Delphi. [illegible] and Olympia.

A special decoration was given to the angles and ends of t [illegible] (Fig. 179).

*horizontal strips."*

For the purpose of ventilating and lighting, special pieces were made for both tile and marble roofs, of which examples of the most diverse kinds are preserved in Pompeii.(J. Durm. Baukunst der Etrusker und Römer. 2 nd edition. p.333. Stuttgart. 1905).

The ridge was either covered by great hollow tiles, into the sides of which were inserted the covering tiles, or a sort of mouth-piece was allowed to project, into which entered the ends of the covering tiles, or hollow and flat tiles were curved to the form of the roof and fastened on the ridge, so that the latter was protected in an excellent way. The c continuous hollow tiles were lapped; the joints were often particularly accented by rounds (Olympia, Selinus), on their crest being arranged palm-leaves parallel to the eave.(Fig. 176).

A rich collection of Grecian roof tiles, as well as those employed on valleys and hips, according to the fragments, is to be found in the great German work on Olympia, Vol. 2 of P Plates, in plates 96-100, as well as attempts at restoration of hipsand valley tiles.

More difficult indeed was the case of the covering of circular buildings.

Fragments of white marble tiles, that indeed belonged to t the Tholos, I found in April, 1906, among the fragments in t the Museum at Delphi.

Accordingly the covering tiles extended radially from the vertex to the eave, when those in its vicinity (vertex) were cut from a single block, on account of the difficulty of jointing.(Fig. 177, not before published). The covering tiles were wrought on the flat tiles, thus being in one piece with them, as made probable for the marble tiles in Phigaleia by von Stackelberg. I have not seen the originals of the latter myself, but have measured and sketched the pieces in Delphi.

Pieces of similar form in clay were likewise found in Athens and Olympia.

A special decoration was given to the angles and apex of t the pediment by the so-called acroterias.(Fig. 178).

A structural reason for them did not exist; arrangements f

for them are wanting on the Theseion, on the so-called Temple of Concordia in Akragas, and on the temples in Paestum and Segesta, while the pediment cornice slabs are yet in place undisturbed; had these angle stones been laid there as loads necessary for abutments for opposing the thrust of the cantilevering cornice slabs, by removal of the former, the latter must have slid off, which was not the case, and that was inconceivable from the construction of the adjoining stone of the pediment, the form and position of the intermediate blocks.

On the Parthenon, the base stone lies in the angle of the mitered-out marble gutter and leaning this, but rather, sagging to overload and tilt over the projecting parts, than to fix them. The same was the case with the vertex acroteria, [illegible] slabs. (With this view, see the drawing of the acroteria of the Temple of Aphaia on Aegina see Fig. 179).

On roofs without water gutters along the sides, the concave tiles must extend to the front edge of the eave tiles, and the latter then receive them disk-shaped decorated plates to conceal or close the opening. These antefixes or vertical antheminons, repeated at short distances, adorned the eaves of the lower sides in the most beautiful manner. Later, as on the Parthenon (Fig. 179), they were placed independent of the covering tiles and without connection with them, serving for no special purpose, but they were indeed of an ornamental nature. On roofs with collecting gutters, antefixes frequently occurred on the cyma, that for structural reasons, which originated from the lengthening of the cover tiles to conceal the joint of the two adjacent pieces of the cyma.

[illegible] Temples [illegible] Temple. [illegible] Temple in Aegina [illegible] antefixes decorated covering plates (antepagmenta) and antefixes with entire little figures on the Temple in Aigina. [illegible]

[illegible]

for them are wanting on the Theseion, on the so-called Temple of Concordia in Akragas, and on the temples in Egesta and Paestum, while the pediment cornice slabs are yet in place undisturbed; had these angle stones been laid there as loads necessary for abutments for opposing the thrust of the obliquely rising cornice slabs, by removal of the former, the latter must have slid off, which was not the case, and that was impossible from the construction of the starting stone of the p pediment, the form and position of the intermediate blocks.

On the Parthenon, the base stone lies in the angle of the hollowed-out marble gutter and loading this, but rather tending to overload and tilt over the projecting parts, than to fix them. The same was the case with the vertex acroteria, since the base stone was there placed in the cyma, on the freely projecting and not on the supported part of the cornice slabs. (With this view, see the drawing of the acroterias of the Temple of Aphaia on Egina and Fig. 178).

On roofs without water gutters along the sides, the concave tiles must extend to the front edge of the eave tiles, and the latter then received before them disk-shapted decorated plates to conceal or close the opening. These antefixas or vertical anthemions, repeated at short distances, adorned the eaves of the longer sides in the most beautiful manner. Later, as on the Parthenon (Fig. 179), they were placed independent of the covering tiles and without connection with them, serving for no special purpose, but they were indeed of an ornamental nature. On roofs with collecting gutters, antefixas frequently occurred on the cyma, that for structural reasons, which originated from the lengthening of the cover tiles to conceal the joint of the two adjacent pieces of the cyma. [1]

*Note 1. See interesting examples of terra cotta antefixas in Campana, G. P. Antiche Opere in Plastica. Rome. 1842; likewise decorated covering plates (antepagmentas) and antefixas with entire little figures on the Temple in Alatri.(Bassel. Neu aufgefundener Temple in Alatri. Cent. d. Bauv. 1886. p. 197, 207); Borrmann & Neuwirth; Durm, Baukunst der Etrusker und der Römer.*

The Attic monuments of the period of Pericles had marble tiles throughout, of which Pausanias makes particular mention;

he says of the Temple of Zeus in Olympia, that the roof was not covered by burned tiles, but with Pentelican marble cut in the form of tiles, a procedure that Byzes of Naxos must have first introduced. [2]

*Note 2. The industry of cutting roof tiles from marble must have been native on Naxos at certain times, according to later researches. Of coarse-grained white island marble, such as the ancient quarries on the north end of the island of Naxos supplied, were the remains of tiles of the Temple of Zeus found in Olympia (thus contrary to the statement of Pausanias, Book V, Chapter 10, 3), as well as the remains of tiles of antepersian buildings on the acropolis of Athens. The roof tiles of the Parthenon and of other postpersian structures on the acropolis and in the city of Athens were of the lower white Pentelecan marble, the upper surface indeed appearing to be sawn and the lower chiseled.(See Lepsius, G. R. Griechische Marmorstudien. From Appendix to Abhand. d. Kön. Preuss. Akad. d. Wiss. Berlin. 1890.*

Division V. City walls, retaining and terrace walls with and without buttresses, stonecutters' marks, setting marks, and city plans.

As stated under Division II, the oldest stone structures, Troia, Knossos, Tiryns and Mycenae. The work of their excavation was devoted to utilizing existing materials afforded by the immediate vicinity. Thus for example, massive ashlars in the walls of Tiryns and Mycenae, airdried bricks with incised bases in Troia, also airdried clay bricks in Assyrian and foreign cities (Khorsabad, Uruk) -- kinds of natural stone and produced moulded bricks.

Of the enclosing walls belonging to the historic period, higher and lower city or the temple precincts in Babylonia

Thus for example, according to the drawings of Clermont in Medamis-e-Ud [1], the original city walls were constructed of the 1.97 to 2.85 ths., with alternating headers and stretchers in the same course and 7.55 ft. thick. The principal towers projecting 3.55 to 16.40 ft., as shown by its. 185.Concerning the elevation of the wall and the form of the defensive passage, information is lacking.

Note 1. See [illegible] p. [illegible] article [illegible] port on the results of excavations in the year 1891-1893 by [illegible] Humann.

According to Vitruvius (Book 1, Chapter 5), the distances between the towers was to be chosen so as to correspond to the flight of an arrow.

Division V. City walls, retaining and terrace walls with and without buttresses, stonecutters' marks, setting marks, and city plans.

As stated under Division II, the oldest stone structures were not constructed according to a harmonius and uniform system, sufficient evidence of which is given by the walls of Thera, Troja, Knossos, Tyrins and Mycenae. The mode of their execution was devoted to utilizing existing materials afford- by the immediate vicinity. Thus for example, massive ashlars in the walls of Tyrins and Mycenae, airdried bricks with inserted beams in Troja, also airdried clay bricks in Assyrian and Persian cities (Khorsabad, Susa) -- kinds of natural stone breaking into large and small blocks, together with artificially produced moulded bricks.

Of the enclosing walls belonging to the historic period, most do not precede the 5 th century B.C. They surround the higher and lower city or the temple precincts in interrupted long lines, frequently guarded by towers at definite distances. Towers also protected the entrances to the interior of the city, which were arranged for occupancy internally and were furnished with slot openings for archers.

Thus for example, according to the drawings of Clerget in Magnesia-a-M [1], the original city walls were constructed of hard limestone ashlars full of holes and with bosses projecting 1.97 to 2.36 ins., with alternating headers and stretchers in the same course and 7.55 ft. thick. The principal gateway was flanked by two towers 28.22 ft. wide, whose front walls were 14.27 ft. thick. Besides these were also sally ports and breaks projecting 6.56 to 16.40 ft., as shown by Fig. 180.Concerning the elevation of the wall and the form of the defensive passage, information is lacking.

*Note 1. See Magnesia-am Meander. p. 19. Berlin. 1904. Report on the results of excavations in the year 1891-1892 by C. Humann.*

According to Vitruvius (Book 1, Chapter 5), the distances between the towers was to be chosen so as to correspond to t the flight of an arrow.

In Priene [2] were arranged 10 towers in the acropolis wall and only 16 in the much longer city wall at accidental dist-

distances of 196.85 to 984.30 ft. Four of these towers were habitable and contained 3 living rooms for a permanent guard. The walls were founded on the rock and executed with similar cut rectangular blocks(emplecton); between two ashlar facings was a filling of stone spalls and clay, the visible faces of the ashlars being rough bosses (rusticated) and no dressed margins. Only the make an exception thereto.

*Note 2. Priene. Ergebnisse der Ausgrabungen und Untersuchungen in den Jahren 1895-1898 von Th. Wiegand und H. Schrader. Berlin. 1904. Concerning the arrangement, construction, and the s subdivision of the material, this publication is a model, and it cannot easily be excelled by any other, not merely in the German empire, but entirely in general.*

Philo requires, that the masonry of the towers should not be bonded with the adjacent masonry of the walls.

The city walls in Faestum [1] are built of travertine ashlars and still enclose the ancient city area with a perimeter of about 3.11 miles. The square eastern tower is still excellently preserved to a height of about 13 courses of the finest jointing. In the jointing of the masonrya regular bond is not observed, for in height two equal courses of stones with square faces alternate with small courses one half as high, and the end joints frequently extend vertically through several courses. "With especial skill the enclosing wall of Ephesus [2] was laid out, which frequently remains in 15 courses, has square projecting towers at distances of 32.8 ft., and it requires a special publication, for which the drawings are already commenced." The enclosing walls form one of the greatest systems of fortifications left to us by antiquity. At the part on the Coressos is found a tower with an internal court.

*Note 1. Founded in the 6 th century.*

*Note 2. Forschungen in Ephesos, I, published by Oest. Arch. Inst. p. 222. Vienna. 1906. For the plan, the map of Captain A. Schindler is particularly notable.*

Of the Hellenistic period, the walls, gates and towers at Perge are to be particularly mentioned, since in addition to the plans the upper part of the structure is almost entirely preserved and remain assured in form and arrangement with the wall slots, windows, low gable roofs, and these pertain to the earlier fortif-

fortifications of Perge.(Fig. 181).

[illegible] ft. [illegible] ft. and average courses 1.97 ft. high.

[illegible] as opened from Black Castle, the [illegible] closing walls, bears the Hellenistic stamp -- a double gateway flanked by two round towers and transformed into a state gateway.

[illegible] protected gate are subdivided by niches; the piers of the [illegible] gateway remain to the height of 3.99 ft. and were [illegible] with architrave and cornices yet exist. The round towers have a [illegible] of 22.64 ft. and walls 7.87 ft. thick. As interpreting re[illegible] source drawing and a safe restoration of the Hellenistic exterior of the tower based thereon is given by E.Niemann and Petersen, [illegible] Niemann and Petersen, edited by Count Lanckoronski. "Si[illegible] Pisidien," 1890.

We shall not forget, even if they also afford nothing [illegible] tural, what the Hellenistic fortifications do give: the work [illegible] Syracuse and of the fortress of Priapolos, and still less Ma[illegible] sive fortifications on the northern front of the acropolis of [illegible] by the Pastideiteans and after 409 B.C., with the [illegible] bastions and the projecting semicircular towers, as [illegible]

Defensive galleries and battlements, behind which men could [illegible] test themselves from the shots of the enemy, and between which the enemy might be smoked, or even simple covering [illegible] into the adjoining walls. Of the walls at Sparne are [illegible] or battlements of the simplest kind; in Pompeii they still [illegible] by and over, which was faced with earlier walls with [illegible] abutments and buttress, 5.66 ft. or more in total thickness.

[illegible]

fortifications of Perge.(Fig. 181).

The towers are 19.69 to 22.97 ft. wide and 26.25 ft. deep with a height of 42.65 to 45.93 ft, their walls having a thickness of 4.13 ft. and ashlar courses 1.97 ft. high.

The three walls exposed to attack have arrow slots. In a higher degree than these towers, the southern gate, now within the enclosing walls, bears the Hellenistic stamp -- a double gateway flanked by two round towers and transformed into a state gateway. (Fig. 182).

The crescent-shaped enclosing walls of the court of the older principal gate are subdivided by niches; the piers of the triple arched gateway remain to the height of 3.28 ft. and were decorated by pilasters and columns. Their entablature blocks, voussoirs with archivolts and coffers yet exist. The round towers have a height of 35.56 ft. and walls 7.22 ft. thick. An interesting measured drawing and a safe restoration of the Hellenistic exterior of the tower based thereon is given by G.Niemann and Petersen on page 61 of the beautiful work; "Städte Pamphyliens und Pisidiens" by Niemann and Petersen, edited by Count Lanckaronski. "ol. 1. V Vienna. 1890.

We shall not forget, even if they also afford nothing architectural, what the Hellenistic fortifications do give; the walls of Syracuse and of the fortress of Epipolae, and still less the massive fortifications on the northern front of the acropolis of Selinus, that Hermocrates erected after the destruction of the city by the Carthaginians and after 409 B.C., with the semicircular b bastions and the projecting semicircular towers, as well as the peculiar covered sally-ports into the ditch.(Fig. 183).

Defensive galleries and battlements, behind which men could protect themselves from the shots of the enemy, and between which the enemy might be annoyed, or even simple covering courses terminate the ascending walls. Of the walls at Messene are still given battlements of the simplest kind; in Pompeii they still appear furnished with cross projections to protect the back.(Figs. 184, 185). The masonry consists of a nucleus of quarried stone masonry and clay, which was faced with ashlar walls with courses of s stretchers and headers, 6.56 ft. or more in total thickness.

Otherwise the enclosing walls (definsive walls) of cities and temple precincts were mostly carefully built of great polygonal

ce horizontally coursed ashlars without mortar. In time of need and distress were constructed without regard to similar material and jointing. "Walls composed of all sorts of stones and even some small [illegible] by columns from tombs were built in, and even stones wrought by the sculptor"-- thus Thucydides describes the walls of Athens [illegible] ately cut stones were laid on each other and connected together by [illegible] the roughly coursed masonry must be built quite thick, while for [illegible] ns with a carefully bonded coursing of ashlars of medium size. [illegible] joints were not always vertical, but were largely cut obliquely, is found on Egyptian ashlar masonry, that can be dated [illegible] 1500 B.C.; it is there characteristic that some [illegible] into other courses, a procedure transferred to Greece in [illegible] the earlier period.(Ris. 180). The different ashlars in [illegible] course of wood, also by mortar of lime and sand, while the [illegible] principle remains the same as here; excepting the [illegible]

Note 1. There may still be seen today in the city walls of Ath[illegible] of columns, triglyphs and cornice blocks. A portion of the [illegible] ed, technical interest is further in the dismantling the parts [illegible] ed quarries over the Greek Fashions by carrying [illegible] see. (May. 1921).

or horizontally coursed ashlars without special decoration, or in time of need and distress were constructed without regard to similar material and jointing. "Walls composed of all sorts of stones, here and there even uncut and just as they were brought; also many columns from tombs were built in, and even stones wrought by the sculptor"-- thus Thucydides describes the walls of Athens as rapidly rebuilt after the Persian wars --, while the walls of Piraeus were most carefully constructed. [1] No binding material, neither lime nor mortar, was employed for them; the great and accurately cut stones were laid on each other and connected together by iron cramps set in cast lead. To have the necessary stability, the roughly coursed masonry must be built quite thick, while for that definitely coursed and made of squared or polygonal blocks, the stability depended upon accurate fitting of beds and end joints with a carefully bonded coursing of ashlars of medium size. (Fig. 188). The horizontal coursing of ashlars set dry, whose end joints were not always vertical, but were largely cut obliquely, is found on Egyptian ashlar masonry, that can be dated back to 1600 B.C.; it is there characteristic that some stones project into other courses, a procedure transferred to Grecian masonry of the earlier period.(Fig. 189). The different ashlars in Egyptian buildings were frequently connected together by double dovetail cramps of wood, also by mortar of lime and sand, while the Greeks employed for this purpose in addition to wooden cramps those of iron set in cast lead, or more rarely those of bronze. Whether the method of the indirect connection of ashlars may or may not have been brought by Grecian colonists from Egypt to Greece; the principle remains the same as here; excepting the connecting material is wood in the one case and metal in the other.

*Note 1. There may still be seen today in the city walls of Athens these portions of the wall built in haste, mixed with drums of columns, triglyphs and cornice blocks. A portion of the wall of Themistocles in Athens near the Dipylon is given in Fig. 186, according to Professor Noack being an archaic grave stele, the sculptured side turned inside, discovered in the spring of 1906, whereby the description of Thucydides is shown to be correct. Of technical interest is further in the vicinity the partly destroyed vaulting over the brook Eridamos by corbelled ashlars in courses. (Fig. 187).*

The ancient walls of Assos in Asia Minor (Fig. 190), which surrounded the ancient Doric temple, are constructed of low courses of ashlars, carefully wrought on the faces and in the joints; headers and stretchers alternate in a course, so that the headers extend entirely through the wall, but the stretchers do not reach the middle of the wall and leave voids; over the entrance doorways, where the recessed lintel is to be relieved, headers are found in every third course. In other portions of the wall, which have the considerable thickness of 9.35 ft., ashlar facings are arranged on both sides with infrequent headers, but with solodly constructed bonds at angles, so that the middle third of the wall is composed of unwrought material, a mode of construction seldom found elsewhere that in Grecian masonry. This regular coursing, together with the smaller dimensions of the stones, appertains to the later period in Egypt, and it always indicates an early one in Greece.

The opening of a gateway in regular masonry is usually a vertical rectangle or trapezoid, and it is also covered by a large horizontal stone lintel, while the recess for the gate is semi-octagonal, semicircular or pointed-arched at top, although this arched form is produced by corbelling out.(See forms of gateways in Assos and in Acarnania; Fig. 191). The arched form composed of two stones cut in curved shape is found in Acarnanian walls (Fig. 192) beside such with voussoirs. [1] In polygonal masonry the arched spanning of openings almost results of itself. Likewise triangular covering of the same and formed by corbelling, or a stepped horizontal covering, or a complete equilateral triangular shape of the opening for light are found. In Selinus the passages into the ditch of the external works of the acropolis are formed by projection of the stone courses with a horizontal ashlar. Allied shapes are also at the Royal Tomb near Knossos on C Crete and in purely triangular form at the Fountain House at Termessos. [2] A combination of polygonal masonry with semicircular arches of voussoirs is shown by a so-called Cyclopean wall in Cnidos.(Fig. 193).

*Note 1. See semicircular gateway arches formed by projecting courses, beside such with voussoirs in Perrot & Chipiez. Vol. 1. Egypt. p. 112-114.*

*Note 2. See Fig. 183, from the publication:- "Aus dem klassischen Süden." Pl. 121. Lubeck. 1896. Also Fig. 195, from "Städte*

*Pamphyliens und Pisidiens by Lanckaronski. Vol. 2. Pisidien. p. 59. Viennn. 1892.*

But pointed and round-arched forms of gates occur on the battlemented city walls of Nineveh;[3] arches and vaults were already found in Egypt in the time of Usurtesen I (2200) B.C.). A small vaulted tomb existed in Thebes, in the Valley of the Queens, whose arch bore an inscription in whilh Amenophis I occurred; another tomb exhibited the name of Thothmes III (1597 B.C.). The entrance to one of the Ethiopean pyramids is vaulted in the form of a depressed arch; the stones are cut as voussoirs and the joints are filled with fine cement and stone chips. Hoskins regards these pyramids as more ancient than those in Egyptian Thebes; hence the arch dates back in Egypt to before 3000 B.C. The Chinese assert that they have possessed it from time immemorial.

*Note 3. See Layard. Nineveh and its Remains. Vol. 2. London. 1849.*

The invention of the arch cannot be ascribed to any particular people with certainty; it may have been made by different nations at the same time in different localities; in countries possessing but little wood, or where large blocks of stone were quarried, and men were required to construct a firm protecting ceiling with small pieces of stone, the inventive genius of mankind must then have led to similar results, for necessity is indeed everywhere the mother of invention!

The Etruscans were the first European race to introduce a frequent use of the arch in its buildings, while it was scarcely used by the Greeks, or at least was not accepted as a motive in their architecture, although known to the Egyptian and Phoenician colonists, who immigrated into Greece, although the Greeks may have seen it among neighboring peoples and have learned it from them.

Defensive walls constructed in accordance with Egyptian rules (horizontal courses of trapezoidal ashlars), or after Phoenician rules (polygonal ashlars like those of Tiryns and Argos), are quite extensively found in Greece and are contemporary. Notable in many cases is the double rebate form of the angle of two portions of the wall intersecting at right angles.(Fig. 194).

Considerable remains of these walls are found in Greece in addition to those already mentioned:--

In Ithaca, -- in the style of Tiryns.
On Gebalonia, -- in polygonal coursing.
[illegible]
In Zaos, -- the same.
In Mistenia, -- polygonal and rather nodler than at Tiryns.
In Scotynia, -- arranged more nearly horizontal.
In Tsoubia, -- almost entirely horizontal.
In Ginadsi, -- horizontal courses with oblique end joints.
In Aiolia, -- polygonal.
In Goronea, -- the same.
In Alai, -- the same.
In Lycosura, -- the same.
In Zaphne, -- the same.
In Platea, -- the same.
In Oiaone, -- the same.
[illegible]
In Ebrasia, -- the same.
In Messene, -- the same.
In Mathara (Arcolia), -- the same.
In Klaitor (Arcadia), -- the same.
In Samos, -- the same, etc.

[illegible] or employed, but magnificent portals -- propylaeons-- with portices and roofs decorated by pediments formed the entrance [illegible] dicated the facade of the temple, from the simple arrangement [illegible] Ionion to that most richly developed at Athens.(Pipe. 1?6. 1[illegible]

[illegible] finally commenced as a Doric outlying by the Fleuterbird-a. Buttresses at regular distances interrupt the walls, which are rattering on their inner sides, giving them great stability with a moderate use of material. The coursing is uniformly horizontal [illegible]

On Ithaca, -- in the style of Tiryns.
On Cephalonia, -- in polygonal coursing.
In Euphagion, -- courses more nearly horizontal, with projections of the ashlars into other courses.
In Paos, -- the same.
In Elateria, -- polygonal and rather nobler than at Tiryns.
In Cortynia, -- arranged more nearly horizontal.
In Psophis, -- almost entirely horizontal.
In Oiniadai, -- horizontal courses with oblique end joints.
In Aiolis, -- polygonal.
In Coronea, -- the same.
In Abai, -- the same.
In Lycosura, -- the same.
In Daphne, -- the same.
In Platai, -- the same.
In Oinone, -- the same.
In Eleutherai, -- horizontal with inclined end joints.
In Pharsala, -- the same.
In Messene, -- the same.
In Methana (Argolis), -- the same.
In Kleitor (Arcadia), -- the same.
On Samos, -- the same, etc.

When the walls enclosed large temple precincts, as in Olympia, Athens, Eleusis, etc., gateways without decoration were no longer employed, but magnificent portals -- propyleions-- with porticos and roofs decorated by pediments formed the entrance and indicated the facade of the temple, from the simple arrangement at Sunion to that most richly developed at Athens.(Figs. 196, 197).

Remains of retaining walls have been preserved for us at Delphi [1] and in the temple terrace of the Olympeion at Athens, originally commenced as a Doric building by the Pisastratides. Buttresses at regular distances interrupt the walls, which are battering on their inner sides, giving them great stability with a moderate use of material. The coursing is uniformly horizontal at Athens, with a tolerably uniform height of the stones (1.84 to 2.23 ft.). Headers and stretchers alternate in the individual courses, although not regularly; 3 stones together make up a length of 18.70 ft.( equal to the distance between the buttresses), with a maximum of 19.69 ft. (Fig. 198). The stones are

set without mortar; the headers extending into the wall up to 4.92 ft., and the breadth and height of the stretchers are usually equal. Their faces are in part brought to a perfectly true surface and are partly finished with marginal drafts and bosses. The inclined buttresses project from the wall as much as 3.28 ft.; individual stones of these bond into the masonry; others merely abut against it.

*Note 1. See the statements and the representations of walls with "wavy" beds in Division 2 of this volume.*

Walls strengthened by buttresses are also found on the Stoa of Hadrian at Athens, then on the Palestra or Gymnasium (?) at Perge, and further on the late Hellenistic terraced structures of the lower Gymnasium at Priene, executed in a grand manner at the lower end of the theatre terrac at pergamon. The buttresses here project as extensions of the transverse walls, 5.58 ft. at their bases and taper into the wall surface at top.(Fig. 199), from the great German work on Pergamon. Vol. 4. Pl. 46). The inclined edges have marginal drafts.

In the principal cemetery of the Athenians in the vicinity of the Dipylon (now a cemetery near Agia Triada), there still are magnificently constructed continuous retaining walls composed of extraordinarily fine and beautifully wrought ashlars, polygonal, trapezoidal, and those with reentrant angles. The jointing of these is finely executed in a masterly and dinished manner; the faces of the stones are very slightly convex at their centres and are not perfectly smooth, this being caused by the crisp and shelly fracture of the stone. The stones differ greatly in size, running from triangular spalls measuring but a few square inches up to blocks having 10.76 sq. ft. of face. (Fig. 200).

The beds are horizontal throughout, though the courses interlock into each other. Headers and strethcers alternate quite irregularly in them, the former bonding into the wall up to 4.92 ft., the latter only 0.82 to 0.98 ft. The stones are in contact for but an inch or so in the joints, this being sometimes reduced to a mere edge, in a manner not to be recommended. The interstices between the stones at the back, like the external masonry, are filled dry with little fragments, large uncut blocks then abutting against them to make up the required thickness of wall.

At the same place, we likewise find a stepped wall of Poros a ashlars, whose bosses project an average of 1.57 ins., and which have very finely pointed drafted margins 2.36 ins. wide. In accordance with the arrangement of the bosses, these drafted margins extend around only three sides of an ashlar.(Fig. 201).

On a prepared horizontal footing course, we find finely executed polygonal masonry of breccia in the southern fortress wall of the acropolis at Athens, and in the vicinity of this portion are also others, where the smallness of the pieces of blue limestone and of reddish breccia employed is striking. The smallest chips are again used, and economy of the material is carried to the extreme point. The stones bond 7.86 to 23.6 ins., and the beds are dressed smooth in the finest manner for a depth of 3.93 to 4.72 ins.

Such bits of walls are frequently only built to fill gaps in the naturally solid location of an area, as shown by examples on Samothrace;[1] they are then not regularly finished on top, but that is frequently left jagged.[2]

*Note 1. See Gonze, Hauser & Neumann. Archaeologische Untersuchungen auf Samothrace. Vol. 1. p. 29. Vienna. 1875.*

*Note 2. Similar examples are found in the so-called pagan walls in southern Germany.*

One peculiarity also appears in the walls of the Stoa of Hadrian at Athens, subdivided by buttresses, where the ashlars with drafted margins and bosses are set on edge and are unpleasing, as well as the sunken triangular bed joints.(Fig. 201).

In the retaining walls of the Altis at Olympia next the slopes of the hill, the porous yellow limestone blocks have an average size of 1.15 to 4.26 ft., were connected by double dovetail wooden dowells (?), and their ends were joined by wooden pins. (Dowells and cramps have disappeared). The wall is subdivided by buttresses 207 ft. wide and projecting 4.27 ft., which are placed at distances of 19.70 ft.

An interesting combination of polygonal masonry and horizontal courses is shown by the retaining walls of the Theatre in Balbura (Lycian highlands), also furnished with buttresses. The walls are faced with polygonal, and the buttresses with rectangular b blocks. Semper assumes the buttresses of the substructure to be merely ornamental, merely parastates, comparable to the ends of

the timbers of Swiss houses. Their structural purpose cannot be denied.

Peculiar is the treatment of the faces of the ashlars of the plinth in Epidauros (Fig. 202) with narrow scalloped bands.

The ashlars dressed on all sides, that were completely prepared by the stonecutter, frequently bear marks on the surface, that are similar to those on the stones of mediaeval structures. Their use extended over the entire ancient world.[1] In Persepolis, Egypt, Jerusalem, on Crete, in Damascus, Baalbec, Sidon, on the Eryx, in Pergamon, on the Treasury of Sicyon in Olympia, on Samothrace, in Sicily, lower Italy and other places, it everywhere appears.

*Note 1. See Richter, O. Ueber Antike Steinmetzzeichen. 45 th Programm f. Winckelmannsfeste d. Arch. Ges. zu Berlin. Berlin. 1885.*

On blocks like the stones of the Cyclopean walls, which were prepared on the site just before setting, the marks are not found. They possessed no meaning for the building, but merely referred to the production of the dressed blocks, -- they were indications of origin, contractor's marks, but were not individual marks of the workmen. Fig. MOC represents such marks from Eleusis and Samothrace.

Yet as the area within protecting and defensiwe walls was settled, as the dwelling places and temples were arranged, -- how was the building plan of the city created? The regular plan of the lay-out of the streets is not to be ascribed exclusively to the Alexandrine period. If Athens and Sparta and many other cities were not planned with T-square and triangle, there were already in the earlier time different great cities in the colonies, for example Selinus and Paestum. The former had its orieotated temple and also orientated streets. Two chief arteries of traffic intersected at right angles the city in the directions of east to west and north to south, into which again opened at right angles the lesser streets. Selinus was founded in 628 B.C. and destroyed in 409 B.C. by the Carthaginians, but the plan of its streets is as old as its temple -- and prealexandrine. The same is also true of Paestum, founded about 600 B.C., where the course of the streets is determined by the locations of the gates. Its temples are to be placed in the 5 th century and its straight streets as well.

the flesh and the garments; the ground from which they rise was harmonized with the blue of the triglyphs, light red or light blue in color (Selinus or Olympia), or it was left white in the local tone of the walls and columns.

The cap band of both was adorned by rising anthemion ornaments or by interwoven bands without direction; the beads above it gleamed with gold. The vertical band above the triglyphs and resulting from the undercutting of the cornice was decorated by a bluish-yellow or golden fret pattern on a red ground; the mutules were covered by the same blue as the triglyphs and beset with golden or red drops. The intermediate narrow surfaces and the undercut cornice were of vermilion red, the former being yet more richly decorated by golden palm-leaf ornaments. The ogee cyma above the facia had outlined and recurved leaves colored green and red, which also extended along the pediment beneath the cornice. The figures of the pediment had the natural colors; their weapons and attributes gleamed in gold and rose from a red, blue or white ground, like the reliefs of the metopes. The The cymas were adorned by golden anthemions, the fillets beneath them having a fret or wave-line, the small echinus member with recurved red heart leaves, outlined with midribs on a green ground.

*Note. Compare the colored restoration of the Parthenon pediment in Durm's "Konstruktive und polychrome Details der Griechischen Baukunst." Berlin. 1880. Plates 9, 10, 12 and colored Plate III -- in which the attempt is made to leave the metopes and the ground of the pediment light. The occasion for this was the effect of the polychrome figures on a light ground on the royal sarcophaguses of Sidon. Had Fürtwangler, in his colored restoration of the Temple of Egina, placed his strongly colored figures on a light ground instead of the blue one, he would certainly have obtained a nobler effect and a more intelligible character of Grecian architecture. The tympanum of the pediment has a disturbed and too variegated effect, as it is now given.*

The lions' heads of the cyma, the acroteria ornaments, and the antefixas again shone in high colors or were entirely g gilded. The covering and ridge tiles were ornamented by col-

The number of inhabitants of the Grecian cities named above varied at different times. Thus Athens numbered about 100,000 free persons and over 200,000 slaves in the time of Pericles, Syracuse had 500,000 inhabitants in the best period, from Tarentum Fabius Maximus could sell 30,000 citizens as slaves in the year 209 B.C., and Akragas, "the most beautiful city of mortals," counted in about 420 B.C. 200,000 men and 800,000 inhabitants, including slaves and those dwelling in the vicinity.

Division 3. Colored external and internal architecture of buildings.

The use of polychrome painting on the architectural structures, in the Greek civilization, is well known, and evidences thereof are still preserved on the columns walls of the Temple at [illegible] interior of the Temple at Denderah. Pleasure in the color itself, [illegible] nature of the dwellers in the south, may still have been the principal reason for applying this to their works. "The architect flowers of many colors and those of fruits, with which nature decks herself, appear to invite mankind to adorn themselves and all their belongings with the brightest colors possible." (Goethe).

But practical purposes might likewise be served by the use of colored ornamentation; building materials of small resistance were therefore furnished with a protective coating, and the external surfaces of only monuments were concealed by it.

The Greeks indeed followed Egyptian customs and Asiatic habits, when they applied to their palaces and their monuments the colors of equal intensity as their brightest ornamentation to the transgressions and easy destruction of this decorative [illegible] vessels are chiefly preserved for us only on protected [illegible] frequently only on fragments buried in rubbish and sands. And [illegible] their aid on the form and color with tolerable certainty.

We further have evidence based on the ancient writers. Homer and Euripides speak of colored architecture. The walls of the Palace of Alkinous were described as decorated by blue [illegible], in the "Iphigenia" was mentioned the temple with [illegible] right wing of the Propylaion in Athens, on which were engraved the accounts for the work of consolidation and decoration. We [illegible] scaffolds for the painting of the lower part under the roof.

Division 6 Colored external ind internal architecture of buildings.

The use of polychrome painting on the architectural structures of the ancient oriental peoples, the Asiatics and Egyptians, is well known, and evidences thereof are still preserved on the externallwalls of the Temple on Philae and in the interior of the Temple at Denderah. Pleasure in the color itself, which appears in a thousand forms and everywhere in the nature of the dweller in the south, may still have been the principal reason for applying this to their works. "The bright flowers of many colors and those of fruits, with which nature decks herself, appear to invite mankind to adorn themselves and all their belongings with the highest colors possible." (Goethe).

But practical purposes might likewise be served by the use of colored ornamentation; building materials of small resistance were thereby furnished with a protecting coating, and t the external surfaces of ugly materials were concealed by it.

The Greeks indeed followed Egyptian customs and Asiatic tastes, when they applied to their belongings and their monuments the colors of equal intensity as their highest ornamentation. To the impermanence and easy destruction of this decorative and protective means in the open air is to be attributed,that vestiges are chiefly preserved for us only on protected parts, frequently only on fragments buried in rubbish and earth. And yet these exist in a sufficient extent, that we may decide by their aid on the form and color with tolerable certainty.

We further have evidence based on the ancient writers. Homer and Euripides speak of colored architecture. The walls of the Palace of Alkinous were described as decorated by blue garlands, in the "Iphigenia" was mentioned the temple with beautiful columns and gilded frieze etc., and Vitruvius permits the triglyphs to be painted with sky blue wax colors.

A further proof is the unfortunately broken and incomplete slabs of Pentelican marble, found on Oct. 10, 1836, in the r right wing of the Propyleion in Athens, on which were engraved the accounts for the work of completion and decoration. We extract from them, for example:-- "To those that built the scaffolds for the painting of the lower part under the roof,

that painted the symation on the inner architrave 6 cubits per foot ; "as leaves of gold were overlaid for gilding the shells (are beads or heart-leaves meant ?)".

Note 1. According to Penrose, the Attic foot = 0.9967 m. or 1.0.67 American foot.

Elsewhere in the year 1888, during the excavations on the Acropolis in Athens, were found many fragments of friezes and main cornices, which were painted in colors and had retained in the earth a remarkable freshness and animation, and which may still be enjoyed.

But the best evidence for the original painting is still a discovered for us on the Alcmaeonid [illegible] Thesseion. Pathenon and Propylaion exhibit sufficient vestigeson; many interesting architectural fragments of marble or [illegible] the museum of Athens, are [illegible] polishing [illegible] Yet one must not seek colors on the large surfaces of the " columns, on the external parts of the entablature and the cell walls of the marble monuments; for the surface of the marble is worn off on these parts exposed to wind and weather, therefore must a protecting color have already disappeared before the surface of the marble was attacked. That the golden ton color, is hard to conceive.

Note 2. [illegible]

[illegible], and the cornices of Parthenon and of Propylaion there remain [illegible]

to Manis from Kollytos 4 oboli; to the painters -- to him th that painted the cymatium on the inner architrave 5 oboli per foot [1] ; 166 leaves of gold were purchased for gilding the shells (are beads or heart-leaves meant ?)".

*Note 1. According to Dörpfeld, the Attic foot = 0.2957 m. (or = 0.96 American foot).*

Likewise in the year 1836, during the excavations on the Acropolis in Athens, were found many fragments of friezes and main cornices, which were painted in colors and had retained in the earth a remarkable freshness and animation, and which may still be enjoyed.

But the best evidence for the original painting is still p preserved for us on the Athenian monuments themselves. The Theseion, Parthenon and Propyleion exhibit sufficient vestiges; on many interesting architectural fragments of marble or limestone with a coating of stucco, which are contained in the Museum of Athens, the entire painting is still visible. Yet one must not seek colors on the large surfaces of the columns, on the external parts of the entablature and the cell walls of the marble monuments; for the surface of the marble is worn off on those parts exposed to wind and weather, therefore must a protecting color have already disappeared before the surface of the marble was attacked. That the golden tone now partially covering the monuments, and which results from a lichen, could have formerly taken the place of a coating of color, is hard to conceive. [2]

*Note 2. See Durm's "Aus Attika". Zeits. f. Bauw. 1871. p. 471, and the opinions of Landener and of Faraday there mentioned; also Lepsius' "Griechische Marmorstudien," p. 18, 121. Berlin. 1890.*

*According to the latter, Pentelican marble is characterized by its containing iron (lime 56 per cent, carbonic acid 44.002 per cent, iron oxide 0.122 per cent, making a total of 100.124 per cent, while that from the Temple on Cape Sunion by chemical analysis scarcely contains traces of iron in the mass of the stone.*

*The latter has remained snow white; the marble of most monuments in Athens is white on the south side, but it has become golden to brown on the east and west sides, and grayish-white*

[illegible] wan patina must have resulted from the weathering of the surface of the stone, the lime of the marble being dissolved and removed by rain water, while the iron contained in the marble was transformed into brown iron (ironoxyhydrate), whose intense brown coloring is also plainly evident today, even if in very small quantity.

At the elevation the yellowish-brown color predominates on the south sides of the columns and architraves; the marble remains whiter on the other sides, but many dark brown lichens are scattered over it. On the frieze and the fortification [illegible] and lichens, while especially the west sides are covered by [illegible].

[illegible] means to be explained by Jeppsen (page 181): "it also depends upon the weather, together with the rain and the heat of the [illegible]."

[illegible] lia, I had examined a few pieces sent by the late Count Zillmoller Kroef at the Polytechnic School in Charlottenburg, when [illegible] brown that of the surface must be referred to the existence of a lichen.

The Sicilian monuments and the architecture of Pompeii, indeed dating from a later time, likewise exhibit vestiges or even complete painting.

[illegible] us and at the beginning of the last centuries have left us much nearly notes in this respect. While they must have seen much more than those born later. Only in the second half of the last century did the investigations assume definite form concerning this important part of Greek architecture, the external ornamental decoration, and the first who introduced the idea of a complete polychromy did not fail to meet with strong opposition from artists and learned men. An embittered

*to blackish-gray on the north side. The beautiful golden-brown patina must have resulted from the weathering of the surface of the stone, the lime of the marble being dissolved and removed by rain water, while the iron contained in the marble was transformed into brown iron (tronoxyhydrate), whose intense brown coloring is also plainly evident today, even if in very small quantity.*

*At the Olympeion the yellowish-brown color predominates on the south sides of the columns and architraves; the marble remains whiter on the other sides, but many dark brown lichens are scattered over it. On the Theseion and the Parthenon the north sides have remained almost white, but they bear scattered lichens, while especially the west sides are covered by t the golden brown patina.*

*These phenomena are not contested, and the fact that the north sides of Athenian buildings are least colored brown remains to be explained by Lepsius (page 121); "it also depends upon the weather, together with the rain and the heat of the sun." Golden colored marble fragments selected on the Acropolis, I had examined a few years since by the late Court Councillor Knopf at the Polytechnic School in Carlsruhe, when there resulted the absence of iron in the stone, so that the brown tint of the surface must be referred to the existence of a lichen.*

The Sicilian monuments and the architecture of Pompeii, indeed dating from a later time, likewise exhibit vestiges or even complete painting.

It remains to lament, that investigators during the previous and at the beginning of the last centuries have left us such scanty notes in this respect, while they must have seen much more than those born later. Only in the second half of the last century did the investigations assume definite form concerning this important part of Grecian architecture, the external ornamental decoration, and the first who introduced the idea of a complete polychromy did not fail to meet with strong opposition from artists and learned men. An embittered strife with the pen lasted for long years as a result,for and against polychromatic external decoration.

In the year 1823-1824, Hittorf made corresponding statements

about Sicilian monuments, and he presented in his frequently mentioned magnificent work (L'Architecture Polychrome chez les Grecs. Paris. 1851) almost complete prrfs of polychromy. Meanwhile the gifted Semper (Der Stil. Vol. 1. Plates 1, 2, 3 6, 9. Munich. 1860-1863) engaged in the contest in this matter and contributed by word and act the essentials for the settlement of the question at issue.

Likewise the French and English investigators like Desbuisson, Paccard, Burnouf, Penrose and others were in favor of a complete polychromy.

Polychromy on Grecian architecture and sculpture is no longer a question today; to the evidence formerly described (see the first edition of this work, pages 118-120) has been added new proofs during the last decade. In the so-called Persian rubbish on the Acropolis of Athens did these appear, and they fill the Museum on the Acropolis with others in the Central Museum there.

In the most beautiful and complete manner was a portion t thereof published in the magnificent work "Antike Denkmäler" by the Imperial German Arahaeological Institute. Vol. 1. Berlin. 1886-1890. Plates 8, 18, 19, 29, 30, 38 and 39 therein represent by excellent reproductions the originals of painted heads, garments of statues, on which the fabrics are painted with borders in costly work, together with cymas, Ionic and Doric-like caps of steles with their colored palm-leaf, fret, scale and leaf ornamentation.

But the most wonderful and prominent example is preserved on the so=called Macedonian royal sarcophagi, which also determines that works of sculpture of the very highest rank could not lack coloring.(See Durm's Makedonischen Königssarkophage. 1890. Also Hamdi & Th. Reinach. La Necropole de Saida. Paris. 1891).

Otherwise the use of materials of different kinds and colors likewise had already given polychrome coloring to similar works (architectura and sculpture), and the highest attainments of Grecian sculpture were executed in this manner. The Chryselephantine (gold-ivory) statues shone in splendid golden garments, that were again ornamented by painted or enameled decorations (compare the Statue of Zeus in Olympia); the

nude parts glazed in the dull shine of the slightly stained ivory (which would otherwise have assumed in time a dull tone, that has a similarity to the color of the skin of the southerner -- the red cheeks of the Germans are not typical there); the iris of the eye was produced by precious stones inlaid in the pupils. (Compare descriptions of the Minerva at Magara, the statues found at Cotis in 1797, the eye pupils of the Elgin fragments of the Athens on the pediment of the Parthenon, statues and busts in the Vatican, one of which even has inlaid eyelashes of silver.

Likewise the use of [illegible] was often successfully attempted and executed, thus being a commemorial polychromy, that during the late period was compelled to yield to the at first impermanent colorous painting with the brush, shows the requirement for always secure monotone colored. The line procedure is also indicated in sculpture. (Compare the [illegible] Elgin).

To the critics, who compare these facts with modern conceptions of beauty and taste, I might apply Semper's words, used in another place, that "our unsettled aesthetic feeling no longer understands many things that Greeks taste approved and loved, but that the critical feeling is most deceptive in questions of the history of art."

The colors employed by the Greeks in their polychromy were few, and they are usually glazed unbroken beside each other, only the so-called full colors, blue, red, purple, green, yellow and gold, with also brown and black on terra cotta, came into use on surfaces and decorations; rose, light green and violet on the garments of women; they were sometimes applied in thick coats, sometimes in transparent tints or glazes.

Besides the tripiyons, the colored ornaments of the other architectural members are so small and delicate, that at the height where they were applied, they would scarcely be effective, unless they were painted with full colors. This fact is never sufficiently appreciated by those, who in the varicoloured effect oppose the hardness of the tones; the latter were softened by distance and by the proportions.

The oldest stone monuments were built of porous limestone

nude parts gleamed in the dull shine of the slightly etched ivory (which would otherwise have assumed in time a dull tone, that has a similarity to the color of the skin of the southerner -- the red cheeks of the Germans are not typical there); the fire of the eye was produced by precious stones inlaid in the pupils. (Compare descriptions of the Minerva at Megara, the statues found at Ostia in 1797, the eye pupils of the Elgin fragments of the Athena on the pediment of the Parthenon, statues and busts in the Vatican, one of which even has inlaid eyelashes of silver.

Likewise the use of variegated marbles for statues, which was often successfully attempted and executed, thus being a monumental polychromy, that during the late period was compelled to yield to the at first impermanent coloring applied with the brush, shows the requirement for always seeing sculpture colored. The like procedure is also indicated in architecture.(Compare in this sense the terra cottas also).

To the critics, who compare these facts with modern conceptions op beauty and taste, I might apply Reper's words, used in another place, that "our unsettled esthetic feeling no l longer understands many things that Grecian taste approved and loved, but that the critical feeling is most deceptive in questions of the history of art."

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Besides the triglyphs, the colored ornaments of the other architectural members are so small and delicate, that at the height where they were applied, they would scarcely be effective, unless they were painted with full colors. This fact is never sufficiently appreciated by those, who in the variegated effect oppose the hardness of the tones; the latter w were softened by distance and by the proportions.

The oldest stone monuments were built of porous limestone,

in Assos, Sardanon, and those in Sicily (Selinus and Segesta), the Temple on Delos and the ruins of the ancient Temple on the Acropolis of Athens. The structure of the material did not admit of the production of a close and smooth surface, stone impossible. For this purpose it must first be covered by a painting ground, that consisted of a fine white stucco and firmly adhered to the porous stone basis, so that nor in spite of weather and time, graciness of it are preserved. It not with all the excellence of the coating, repairs in this stucco covering became necessary from time to time. Therefore as a result, men looked around for a better material, that would not require this preparation and was not exposed to these disadvantages, and they employed in the best period marble -- in place of the porous conglomerate stone, mainly and this may indeed be one reason, why this as more costly and was sought for.

Just as the more costly material, the gold, must again disappear under painting or enamel, just as well and even sooned stucco in a better way, was covered by color.

The application of the colors on a stucco ground might be made directly while it was fresh or dry; the marble surfaces

were colored during [illegible]

such as columns, architraves and walls, were carefully pol-

[illegible]

are often scarcely perceptible to the eye, and a decomposition

The glazes which were added are characterized by

and others of tufa-like trachyte, as shown by the monuments in Assos, Pergamon, and those in Sicily (Selinus and Akrakas), the Temple on Egina and the ruins of the ancient Temple on the Acropolis of Athens. The structure of the material did not admit of the production of a close and smooth surface, and it made the application of the painting directly on the stone impossible. For this purpose it must first be covered by a painting ground, that consisted of a fine white stucco and firmly adhered to the porous stone basis, so that now in spite of weather and time, specimens of it are preserved. B But with all the excellence of the coating, repairs in this stucco covering became necessary from time to time. Therefore as a result, men looked around for a better material, that would not require this preparation and was not exposed to these disadvantages, and they employed in the best period in Asia Minor and Attica the crystalline white limestone -- marble -- in place of the porous conglomerate stone, shelly or coarse-grained limestone. For this was no longer necessary a special preparation of the surface for receiving color; it might be applied directly on the smoothly polished marble, and this may indeed be one reason, why this no more costly material, but only wrought with more difficulty, was retained and was sought for.

Just as the more costly material, the gold, must again disappear under painting or enamel, just as well and even sooner might it occur, when the white marble, which only replaced stucco in a better way, was covered by color.

The application of the colors on a stucco ground might be made directly while it was fresh or dry; the marble surfaces frequently show special preparation therefor. The parts covered by colors shining through (this could not be proved), such as columns, architraves and walls, were carefully polished smooth, as well as the delicate members of the architectural portions to be decorated. The joints in columns and walls, architraves and cornices were not accented, so to speak; they were therefore so carefully executed, that they are often scarcely perceptible to the eye, and a decoration of them by color does not occur on Doric temples.

The places which were gilded are characterized by a pecul-

particular smoothness of the surface. In many places, and this must have been the oldest procedure, the ornamental drawing was incised in the marble or the fine-grained limestone, i.e., its outlines were incised and then filled with color (fragments of this kind are in the Acropolis Museum at Athens); in other cases the ornament was lightly sketched with the steel point, the ground being scraped or roughened, so that the colors would better adhere; in yet others is the ornament sketched with the brush directly on the smooth stone without a preliminary outlining of the form. (Compare fragments of both sorts on the Acropolis at Athens). Likewise the separate ornaments were perfectly sculptured and afterwards painted. (Compare capitals in the interior of the Propyleion of Athens), which were frequently succeeded by works in variegated marble. The blue and green colors, that covered the marble in a thickness of 1/25 to 1/16 inch, were prepared with wax (for example, as shown by remains of the cornices of the Propyleion and other architectural fragments in Athens), and they had no very firm adherence to the marble surface. (The blue and green, after scaling off, left almost no perceptible traces of color on the marble, while the traces of red penetrated deeply and may scarcely be removed. Compare in this respect various parts of cornices or even a figure in relief, the so-called Warrior of Marathon, and other older correspondingly sculptured or merely painted grave steles in Athens. (See Conze's "Die Attischen Grabreliefs"etc. Plate 2. Berlin. 1890).

May then the Grecian polychromy on the exterior of the temple be assumed as based on Egyptian tradition, or may it be regarded as an art means for heightening the effect of sculpture and architecture and for concealing the slight value of the materials, or may architecture, sculpture and painting be placed as equals, so that it may be said that each one of them may be enhanced by the others; yet so much is certain, that polychromy on sculptures and every kind of architecture was felt to be a necessity.

The light and nearly white tone, that covered the plain portions of the stuccoed stone temples of Sicily,and that also occurs on the cell walls of the Temple on Egina (or was

found there), permits the conclusion, that the same tone was also retained on the marble structures. "This general tint can scarcely have been a thick encaustic layer of color, as for the ornaments, but only a simple transparent coating, which made the tone of the marble uniform, but removed nothing of its natural beauty; it readily assimilated those plain parts of the architecture with the nude figures, whose flesh-colored tone was probably produced by a thin coating, in order to not injure the delicacy in the representation of the forms, while the material objects, such as clothing etc., as stated and as may be seen, were painted in encaustic.(wax).

Furthermore, it is natural, that the surfaces of the marble ashlars are never faultlessly white; they are frequently permeated by bluish or yellowish stripes, which in time become more distinct and produce a play of color on the surfaces. If the ashlars are rubbed smooth or polished, then the colors or gilding laid thereon reflect upon the surface so strongly, that the original "white" cannot longer be perceived as such by the eye.(Compare in this sense Hansen's Academy building in Athens).

If we return to what has been stated, and base upon the remains seen or proved, an image of the painted Doric temple before our eyes, then first the walls of the cell, the columns, architraves and cornices gleam in a white or light yellow tint, while according to the theory of Reber, only the parts shone in varied colors, that were derived from an original wooden style. The capitals of the columns of the best period remain plain and without color ornaments (this was indeed quite otherwise in Paestum), as well as the front surfaces of the architrave, if those did not receive a temporary decoration by captured weapons and by inscriptions, as on the Parthenon and on the Temple of Zeus at Olympia.

Colored or gilded drops hung from the narrow regulas beneath the triglyphs, the regulas being themselves adorned by palm leaves directed downwards or left plain. The crowning cap band is covered by a delicate fret of green and red colors; the triglyphs here have a strong sky-blue, neither blackish nor grayish blue, strongly gleaming tone. The figures of the intervening metopes have the natural colors of

the flesh and the garments; the ground from which they rise was harmonized with the blue of the triglyphs, light red or light blue in color (Selinus or Olympia), or it was left white in the local tone of the walls and columns.

The cap band of both was adorned by rising anthemion ornaments or by interwoven bands without direction; the beads above it gleamed with gold. The vertical band above the triglyphs and resulting from the undercutting of the cornice was decorated by a bluish-yellow or golden fret pattern on a red ground; the mutules were covered by the same blue as the triglyphs and beset with golden or red drops. The intermediate narrow surfaces and the undercut cornice were of vermilion red, the former being yet more richly decorated by golden palm-leaf ornaments. The ogee cyma above the facia had outlined and recurved leaves colored green and red, which also extended along the pediment beneath the cornice. The figures of the pediment had the natural colors; their weapons and attributes gleamed in gold and rose from a red, blue or white ground, like the reliefs of the metopes. The The cymas were adorned by golden anthemions, the fillets beneath them having a fret or wave-line, the small echinus member with recurved red heart leaves, outlined with midribs on a green ground.

*Note. Compare the colored restoration of the Parthenon pediment in Durm's "Konstruktive und polychrome Details der Griechischen Baukunst." Berlin. 1880. Plates 9, 10, 12 and colored Plate III -- in which the attempt is made to leave the metopes and the ground of the pediment light. The occasion for this was the effect of the polychrome figures on a light ground on the royal sarcophaguses of Sidon. Had Fürtwangler, in his colored restoration of the Temple of Egina, placed his strongly colored figures on a light ground instead of the blue one, he would certainly have obtained a nobler effect and a more intelligible character of Grecian architecture. The tympanum of the pediment has a disturbed and too variegated effect, as it is now given.*

The lions' heads of the cyma, the acroteria ornaments, and the antefixas again shone in high colors or were entirely g gilded. The covering and ridge tiles were ornamented by col-

colored leaves and anthemions.

The ceilings of the porticos, by the use of stone, had as a ground tone the same color as the walls; the borders of the c coffers were separated by gilded beaded astragals on a deep blue or green ground, the horizontal surfaces being covered by red fret patterns, the echinus mouldings next the ground of t the coffers with recwrved colored leaves, egg-and-dart mouldings or heart leaves, the ground itself being ornamented by golden stars on a sky-blue background.

The beams were covered on the under sides by painted interwoven bands, with recurved colored leaves on the echinus mouldings along their sides. The cap, that crowned the wall of t the cell and also extended above the frieze, was at top decorated by recurved colored leaves, its band having a golden fret, the ogee beneath with colored heart leaves.

The figures of the cell frieze in natural colors indeed rose from a red, blue or white ground, as for the metopes and the tympanum.

The intervals between the columns of the pronaos were filled by bronze grilles (wooden enclosures are mentioned in Epidauros; see Baunack, p. 81), which extended high, and behind them gleamed vases, drinking cups, beakers, silver lamps and the like. But even piclorial ornamentation was not lacking there; the walls of the vestibule in the Sanctuary of Athena at Platea were adorned by two pictures, painted by Polygnotos; in that at Delphi were inscribed proverbs for use in human life, such as "learn to know thyself" -- "too much in nothing" etc. Statues of bronze were in the vestibule of a temple in Corinth, marble statues of Athena and of Hermes before the entrance to the Temple of Apollo at Thebes; at the entrance to the Parthenon was placed the statue of Iphicrates; in Hermione statues stood around the Temple; the same decoration before the columns was possessed by the indeed Corinthian Temple of Zeus Olympius in Athens. In the middle of the rear wall of the pronaos stood the colossal perforated leaves of the doors of the main entrance, constructed of gilded bronze or of wood inlaid with ivory, thus forming the final ornament of the pronaos and the first on entering the sacred cell. (compare Baunack. p. 79).

*Note. To the representation of the completely executed pol-*

[illegible] was Ingler's formerly contested, a partial one with [illegible] Kunst. Stuttgart. P. Plate 4. A). To one the f[illegible] first appeared too cadaly: to the other was recalled the peculiar shining tint of sauce. The natural material looks as white and as uninteresting as paper, and the weathered tint on the marble is not really as yellow as the painted local tone, in both being expressed the ground principle, that the architectural parts mentioned must be of the lightest color on the building, whether they are somewhat cooler or warmer in tone. [illegible] parts and the ornaments are otherwise approximately the same in both methods: blue triglyphs and the metopes with red grounds at Selinus, blue mutules with gilded drops and red interstices.

The significance of the metope in stone construction, as mommy between two spaces for beams, has given cause to assume the ground of the metopes as being in the tone of the cell wall. If the latter are adorned by figures and the ground painted, as of the light blue of the triglyphs and is finely harmonized, then does one remember little on the contrary, since accessories [illegible] anything of the ground remains, and the colors of the figures are already in contrast to the blue of the triglyphs. The colors [illegible] (perhaps [illegible]) also rise from a white marble ground a [illegible] of colors. Here or there is the colored figure [illegible] on a light ground harmonized by [illegible] color tones in the [illegible] and [illegible].

Less tasteful in color is indeed the work, where the metopes exhibit no figure ornament, where it may [illegible] into [illegible]. Furthermore if the triglyphs were colored a little darker blue, as stated, for example by Pinder (Porticello Polychromie [illegible]). In colored tympanum, with a white local tint of the architecture [illegible] cula by first bands and leaves, as stated, may well have occurred [illegible]

polychromy was Kugler's formerly contrasted, a partial one with white walls, shafts of columns and architraves. (Compare his Denkmäler der Kunst. Stuttgart. B. Plate 4. A). To one the f first appeared too chalky; to the other was recalled the yellowish shining tint of sauce. The natural material looks as white and as uninteresting as paper, and the weathered tint on the marbel is not really as yellow as the painted local tone, in both being expressed the ground principle, that the architectural parts mentioned must be of the lightest color on the building, whether they are somewhat colder or warmer in tone. The data concerning the coloring of the smaller architectural parts and the ornaments are otherwise approximately the same in both methods; blue triglyphs and the metopes with red grounds at Selinus, blui mutules with gilded drops and red interspaces.

The significance of the metope in stone construction, as masonry between two spaces for beams, has given cause to assume the ground of the metopes as being in the tone of the cell wall. If the latter are adorned by figures and the ground is painted, is of the light blue of the triglyphs and is finely harmonized, then does one remember little on the contrary, since scarcely anything of the ground remains, and the colors of the figures are already in contrast to the blue of the triglyphs. The colored reliefs on the so-called Sarcophagus of Alexander (Macedonian royal sarcophagi) also rise from a white marble ground a and have an excellent effect, also well in the entire harmony of colors. Here or there is the colored figure frieze on a l light ground harmonized by firm color tones in the cymas above and beneath.

Less tasteful in color is indeed the work, when the metopes exhibit no figure ornament, where it may sink into tastelessness. Furthermore if the triglyphs were colored a dirty dark blue, as stated, for example by Finger (Dorische Polychromie etc. Berlin. 1886), and there were likewise a just as strongly colored tympanum, with a white local tint of the architecture in general, then Kugler's representation becomes the full toned Renaissance decoration! The ornamentation of the capitals by fret bands and leaves, as stated, may well have occurred on capitals of moderate size and on steep forms of the echinus,

[illegible] way). In view of the American sales -- but it so far has not been proved on any existing stone Doric capital, and therefore [illegible] ity, but not be assumed as a certainty, just like the red and [illegible] ored entirely red are proved, but neither on the Parthenon nor on the Temple on Ægina.

[illegible] figure friezes on the Parthenon and Theseion, but it is probable, if the ground of the metopes was colored.

[illegible] pp. 4-5): -- "Such a polychrome temple -- merely examine the [illegible] 1) or of the Parthenon -- like a rude man, who on a festal occasion has placed on his head a complete wreath of [illegible] flowers." That is a matter of taste and not of science! (See our representation of a Doric entablature, Plate IV).

[illegible] fine-grained limestone the color was directly applied, the effect being first imposed with the steel point and colored. [illegible] masonry of shelly limestone, walls of sunbrick bricks and of the less valuable sorts of stone were covered with stucco, then being painted in fresco or distemper. With the use of [illegible] (crystalline limestone, marble), the worked and flat work was directly finished, the colors being applied directly on the [illegible] ities for polychromy were not exhausted thereby.

*or for greater projections of this with anthemions (see Paestum), in view of the Athenian steles -- but it so far has not been proved on any existing stone Doric capital, and therefore in all colored restorations leaf decoration must be a possibility, but not be assumed as a certainty, just like the red and blue spotted annulets (see Fenger, Plates 1, 2). Annulets colored entirely red are proved, but niether on the Parthenon nor on the Temple on Egina.*

*What may be assumed for the metopes as the ground for the f figures may likewise be assigned for the background of the tympanum, since this is inserted masonry, like the ground of the metopes. White metopes and a white tympanum are indeed in harmony, but never white metopes and a painted blue or red ground for the tympanum. A colored ground is also not proved for the figure friezes on the Parthenon and Theseion, but it is probable, if the ground of the metopes was colored.*

*Further examples of colored architectural parts are also to be found in Le Bas (plates 8, II, 3, 4, 5 6). On Fenger's polychromy Heydemann remarks (Zeits. f. Bild. Kunst. 1887. p. 285-286):-- "Such a polychrome temple -- merely examine the interesting restoration of the Temple of Athena on Egina (plate 1) or of the Parthenon -- like a nude man, who on a festal occasion has placed on his head a complete wreath of variegated flowers." That is a matter of taste and not of science! (See our representation of a Doric entablature. Plate IV).*

According to the preceding, the various kinds of colors depended upon the building material employed; on the soft and fine-grained limestone the color was directly applied, the sketch being first incised with the steel point and colored. (Poros architectural fragments in Acropolis Museum at Athens). Masonry of shelly limestone, walls of sundried bricks and of the less valuable sorts of stone were covered with stucco, in which the final forms of the details were first expressed, then being painted in fresco or distemper. With the use of hard and finer-grained white limestone capable of polishing, (crystalline limestone, marble), the moulded and flat work was directly finished, the colors being applied directly on the carefully prepared surface of the material. But all possibilities for polychromy were not exhausted thereby. In place of

the stucco. there occur the colored terra cotta coverings as [illegible] and beautiful building material, chiefly on the exposed parts of the building.

[illegible] materials; of these the mortar is more commonly employed for covering masonry and terra cotta chiefly as the covering of woodwork. Both the external wooden timbers and the internal [illegible] richly ornamented terra cotta plates." Museums of Sicily and [illegible] les etc.) are rich in terra cotta of this sort. Semper further states, and as evidence he gives three different examples of such.

Others were already published earlier by the Duke de Luynes [illegible] (Voyage archeologique etc. [illegible] ed other materials thereto; Hittorf repeated and extended the same in his great work, "Restitution du Temple d'Empedocles a Selinonte, ou l'Architecture Polychrome chez les Grecs". [illegible] assumes wooden beams covered with terra cotta in his Plates on antique architecture.

To the terra cottas of the great Temple in Selinus publ[illegible] by Hittorf were added others during the seventies, that were [illegible] July, 1876; other pieces were found during the winter 1876-1877 an [illegible]

[illegible] orded new points of view relating to the use of such terra [illegible] erior and porous limestone were covered with a solid facing, [illegible] not only that the paintings on terra cotta were preferable to

the stucco, there occur the colored terra cotta coverings as a protecting and decorative material for the less valuable and beautiful building material, chiefly on the exposed parts of the building.

Semper writes:-- (Der Stil. Vol. 1. p. 446-447. Pl. 3):-- "mortar and terra cotta are very ancient traditional covering materials; of these the mortar is more commonly employed for covering masonry and terra cotta chiefly as the covering of woodwork. Both the external wooden timbers and the internal wooden ceiling of the archaic temple were entirely covered by richly ornamented terra cotta plates." Museums of Sicily and lower Italy (Palermo, Syracuse, Castelvetrano, Metapont, Naples etc.) are rich in terra cotta of this sort, Semper further states, and as evidence, he gives three different examples of such.

Others were already published earlier by the Duke de Luynes and by Debacq (1883), taken from the ruins of Metapont; Le Bas (Voyage Arcaeologique etc. Paris. 1847-1877. Incomplete.) added other materials thereto; Hittorf repeated and extended the same in his great work, "Restitution du Temple d'Empedocles a Selinonte, ou l'Architecture Polychrome chez les Grecs". (Paris. 1851. Plate 10. Figs. 4, 5, 6), particularly adding to Fig. 5; "serving to cover wooden timbers." Viollet-le-Duc likewise assumes wooden beams covered with terra cotta in his Plates on antique architecture.

To the terra cottas of the great Temple in Selinus published by Hittorf were added others during the seventies, that were photographed and published by Fiorelli in "Bulletino" etc. in July, 1875; other pieces were found during the winter 1876-1877 and placed in the Museum of Palermo.

These were then extended by the finds in Olympia, which afforded new points of view relating to the use of such terra cottas. The finds made at the Treasury of the Geloans permit the assumption, that terra cotta was also employed for the decoration and the protection of stone members. There is nothing striking in this, if as especially the case in Sicily, an inferior and porous limestone were covered with a solid facing, and for exposed places, terra cotta was preferable to stucco; not only that the paintings on terra cotta were preferred to

the temporary ones on stucco.

The method of fastening those usually box-like terra cottas on woodwork was made clear by the pieces in Metapont. The clay boxes, decorated by reliefs and painted, are 13 inches high and exist there in great numbers, and they have square h holes in their sides, through which copper (not bronze) nails were driven into the covered woodwork. Abruptly bent copper nails still remain in part in the holes. A greater number of such, that accurately fit in the holes, are preserved in the glass cases of the so=called Museum in Metapont (now transferred to Naples); they all measure 5.12 inches in length and are square with square heads. The metal, shape and size of the nails leave the former fastening in wood beyond all doubt; likewise the fact, that the backs of the terra cottas nowhere show traces of mortar but rather the very clean clay surfaces, which permits the assumption, that these could only have been employed on wood. Pieces from Syracuse and Selinus exhibit similar arrangements for fastening and the same absence of traces of mortar. Since certain pieces are entirely flat and have no projecting mouldings, they may have been plain middle pieces between the two box pieces. On the contrary, others again show moulded projections with conical or cylindrical holes, both on the unpainted and the painted sides. (Compare Fig. 206).

These pieces are not to be regarded as the residuum or as reminiscences of a preceding wooden architecture; they are far more to be taken as a better substitute for stucco in places, where this did not offer complete protection from rain water and injuries by weather. Between the antefixas of the Temple at Selinus, for example, the rain water flowed over the crowning member of the stuccoed cornice and would have soon destroyed this. A durable protection could only be afforded there by the use of terra cotta, as it occurred. It was caused there by the lack of a collecting gutter and was in connection with the clay tile roof, scarcely being older than that. (Compare cymas in Selinus, on the Treasury of Megara and the Treasury of the Geloans in Olympia).

The construction of a collecting gutter with water outlets did not materially change the disadvantages. Every storm must

itectural member. Only by the connection of the gutter with the groove by a lower was this changed.

This crowning of the building by an ornamental cornice found [illegible] colored lint and cover tiles are their antefixes in the decorated ridge tiles, frequently beset by palm leaves, in the angle and middle acroteria, the cymas of the pediment and its figure groups. These monumental parts must be compleised as a terminated entirety and be so judged in their effect. With the exception of the ground tint, the colors were not burned in, so and clay products also extended yet further on the building, as for example, on the Temple of Apollo at Thermon, whose metopes slabs of terra cotta were employed and discovered.

The fastening of the [illegible] above was likewise by metal pins. (Compare cornices of Temple in Selinus).

[illegible] stones, which was executed on the Propylaion in Athens, for example, [illegible] is entirely constructed of Pentelicon marble, only the friezes slate. The natural dark tone of the surface of the friezes made an artificial one superfluous. From it then rose very artistic [illegible] o Tonic entablature).

The existing colored restorations in the different works with plates often differ much from each other, an occurrence to be referred to the painter rather than the author.

Thus Soldekow and Buchstein stated in their beautiful work on the Erechtian temples, that a complete representation of the original distribution of colors on the entablature of the small and late prostyle Temple E in Selinus was presented. (Compare colored plate 22 and page 44 of the text in their work). I [illegible]

drive the rain water flowing therefrom against the lower architectural members. Only by the connection of the gutter with the ground by a leader was this changed.

This crowning of the building by an ornamental cornice found a beautiful extension in the covering of the roof surfaces by colored flat and cover tiles and their antefixas in the decorated ridge tiles, frequently beset by palm leaves, in the angle and middle acroterias, the cymas of the pediment and its figure groups. These monumental parts must be comprised as a terminating entirety and be so judged in their effect. With the exception of the ground tint, the colors were not burned in, so that they have frequently disappeared. But the variegated burned clay products also extended yet further on the building, as for example, on the Temple of Apollo at Thermon, whose metope slabs of terra cotta were employed and discovered.

The fastening of the burned clay pieces on the porous limestone was likewise by metal pins. (Compare cornices of Temple in Selinus).

Besides the polychromy by means of burned and painted clay slabs and boxes on limestone ashlars, there may be mentioned still another, likewise monumental; that by variously colored stones, which was executed on the Erectheion in Athens, for example, and in part also on the Propyleion there. The Temple is entirely constructed of Pentelican marble, only the frieze being of bluish-black Eleusinian, which now has the effect of slate. The natural dark tone of the surface of the frieze made an artificial one superfluous. From it then rose very efficiently the freely wrought small figures in Pentelican white marble, again variously painted. (Compare Plate V; polychromatic Ionic entablature).

The existing colored restorations in the different works with plates often differ much from each other, an occurrence to be referred to the printer rather than the author.

Thus Koldewey and Puchstein stated in their beautiful work on the Sicilian temples, that a complete representation of the original distribution of colors on the entablature of the small and late prostyle Temple B in Selinus was presented. (Compare colored plate 28 and page 94 of the text in their work). In position, yes! -- but somewhat muddy on the paper. Red and

blue were directly applied to the stone, but the white only as stucco on the stone surfaces. Remarkably white stucco is shown by nearly all the ashlars of the Temple of Castor and Pollux in Akragas, that on the columns consisting of a fine yellowish coating beneath, over this being a fine white layer. The best pieces in the Museum at Palermo are all covered by beautiful white marble stucco with boldly applied colors. It is decided for the entire temple, that:--

Red occurs only on the taenia of the architrave, then on the spaces between the mutules, on the fillet above the cyma, and the cyma of the cornice.

Blue on the regulas, with the exception of the drops beneath the triglyphs, on their head band, on the metope band, on the mutules, with the exception of the drops, and on the ground on which the mutules are attached.

Black on the channels and the intersection of the Doric cymatium beneath the cyma. Yet not everywhere may be proved the black color in the channels.

White on everything else -- thus the drops, metopes, architrave, cyma, the mural surfaces, antes and columns.

I am sceptical concerning the use of the black color; I do not believe that it was originally such; for me it is a transformed blue, produced by some chemical change of the substance.

On most of the buildings in Olympia were found the following remains of colors:--

Blue of three kinds, among these being sky-blue.

Red, brownish-red to vermilion.

Yellow, as a bright tone of ochre.

Green, as an earthy covering color of soft effect.

Black.

To this should be added, that the entablatures of all Doric buildings in Olympia were painted without exception. The abacus and echinus of the capital remain without painting and were in general coated with a single color. The metopes without s sculptures remain white, or they were colored over the surfacces. For the metopes with reliefs on the Temple of Zeus, the figures were painted in several colors and rose from a light blue ground. The spaces between the mutules were always white, a characteristic for Olympia.

Only slight vestiges of colors were found on Ionic monuments. (Compare Paul Graf. Olympiawerk. Text II, p. 36. Plates 112-114; the coloring of the architectural members).

*Note. A very good reproduction of the original is to be found in Wiegand's work on the limestone architecture on the acropolis; an excellent one in the "Antike Denkmäler" of the Imp. Germ. Arch. Inst., where the painting of the Ionic capittals and of the clothed female figures from the Acropolis Museum in Athens is made prominent. The original is not attained by the colored prints of Hamdy Bey in the work on the royal s sarcophagi in Sidon; colored plates in Fütwangler's work on Egina hurt the eyes.*

Interesting are also the colored figure friezes on the north and west sides of the Treasury of the Cnidians at Delphi, that are beautifully reproduced in the "Fouilles de Delphi". (Vol. 4. Paris. 1907).

The cautious Penrose gives in his great work on the Parthenon slight traces of red on the spaces between the mutules and of greenish-blue on the mutules and the scotias of the triglyphs. At the latter place in the year 1868, I could still determine quite visible traces of a coating of blue color 1/25 in. thick. The outlines of the ornaments in the coffers, on the ante capitals, the friezes and fillets, Penrose shows in accordance with the actual facts. He assumes red, blue, green and gold thereon.

A further heightening of the colored ornamentation was attained by the addition of metallic ornaments, weapons, bands of gold or gilded bronze, which were attached to the marble sculptures, the eye sockets being also frequently inlaid with enamel or glass eyes, in order to make everything yet more natural. Where these are wanting, their former existence is proved by their fastenings.

So far as may now be seen, the artistic treatment of the interiors of temples in Sicily did not go beyond a painted stucco coating and variously colored terra cotta facings; their a architectural members must also have received the same treatment as on the exterior. Columns, architraves and cornices then remained white with sparingly colored ornamentation. The walls, on the contrary, must have been covered by pictures,

such as Pausanias mentions in the Temple of Theseus at Athens, for example. In the Temple of Zeus at Olympia (compare Fig. 407), from a drawing of Professor Böhlmann in Munich), according to the same author, the "enclosing wall opposite the door-

the Sanctuary of Artemis at Ephesus in Pausanias' time, the

tuary of Asclepios and in the certainly Ionic Erechtheion were still to be seen by him. If no vestiges of these mural pictures

tioned.

Chapels in Athens with gilded ceilings, alabaster ornamentation and pictures are mentioned; the magnificence of the ceil-

aids of bronze were suspended in the Temple of Artemis Ephesia in Thebes, others and garlands in the Temple of Zeus at Olympia, with the armor of Persians in Tegea.(compare Fig. 210 [illegible] part of the ornamentation or the garment of a statue from Ly-

Athens).

On tables rested the finer and richer votive gifts; [illegible] the or the god, or between the columns. The throne of [illegible]

throned, the Fates, the noble Fames of Praxiteles, an Aphrodite in Bronze, the [illegible] of gold and ivory, a bed ornamented with ivory, a [illegible] a

such as Pausanias mentions in the Temple of Theseus at Athens, for example. In the Temple of Zeus at Olympia (compare Fig. 207, from a drawing of Professor Bühlmann in Munich), according to the same author, the "enclosing wall opposite the doorway was colored blue," while the other walls were decorated by the paintings of Panamus. In the Temple at Messene, the paintings on the rear wall represented the kings of Messenia; in t the Sanctuary of Artemis at Olantheia in Pausanias' time, the pictures had vanished by the lapse of time; those in the Sanctuary of Asclepios and in the centainly Ionic Erectheion were still to be seen by him. If no vestiges of these mural pictures are yet preserved, we still have for them the evidence mentioned.

Chapels in Athens with gilded ceilings, alabaster ornamentation and pictures are mentioned; the magnificence of the ceilings with their inlays of gold and of ivory, with their mosaic overlays or bronze plates with cast work are referred to.

The decoration and splendor in the interior completed and enhanced the statues of the gods and the consecrated gifts. Shields of bronze were suspended in the Temple of Artemis Eucleia in Thebes, others and garlands in the Temple of Zeus at Olympia, with the armor of Marpessa in Tegea.(Compare Fig. 210; pa part of the ornamentation of the garment of a statue from Lycosura, also Fig. 209; statue of Pallas in the Parthenon at Athens).

On tables rested the finer and richer votive gifts; others were indeed deposited in special cases, at the feet of the statue of the god, or between the columns. The throne of king A Arimnestos stood as a votive offering in the Temple of Zeus at Olympia; likewise the bronze horse of the Cyniska and a bronze tripod were exhibited there. In the Heraion there stood, besides the ancient chryselephantine statues of Zeus, of Hera enthroned, the Horae, the noble Hermes of Praxiteles, an Aphrodite in bronze, the chest of Cypselus in cedar wood with reliefs of gold and ivory, a bed ornamented with ivory, a discus a and a table for the victors' garlands. In Tegea were suspended the fetters of the Lacedemonians captured in war, the teeth and the "hairless and rotten skin" of the Calydonian boar. F From the time of Hadrian dated a peacock in the Heraion not

for four Vessels, made of gold and shining stones, where the shield of Euphorbus and the bed of Ses were to be seen, as

tone, wrought half in gold and half in ivory in a Temple at Co-
rinth.

From the ceiling were suspended smaller works of sculpture, as in the Sanctuary of Asclepios at Epidon; in the Temple at Mantinea the Thymbalian birds, made of wood or gypsum (also painted, since Pausanias could not determine their material), hung from the ceiling; in the Sanctuary of Hilaira Phoebe at Sparta was hung from the ceiling an egg enclosed by bands(the egg of Leda).

Thus the temple with its consecrated art works appeared as a museum, created by the piety of the people.

[illegible]
428-511) and interpreted by him. They first relate to the preservation of the temple vessels (repairs to vases, kettles, [illegible]
low cups and the like), the purchase of a table for the Pinako-
[illegible]
ple of a hetaie, clay pots or honey for keeping silver or gold, [illegible]
[illegible]
le purified, the statues washed and referred; old and new statues of wood and of stone must again receive polish and co-
[illegible]
and a solution of saltpetre in water, then rubbed with oil or
[illegible]
der to make the material fragrant. For this cleansing of the statue of Athenia, for example, was required:-- spongs, 3 dra-
[illegible]
and for perfume, 5 drachmas (altogether 11 drachmas and 5 obo-
[illegible]
of the temple will indeed be afforded by the further publicat-
[illegible]

far from Mycenae, made of gold and shining stones, where the shield of Euphorbus and the bed of Hera were to be seen, as well as four golden horese with ivory hoofs, then the two tritons, wrought half in gold and half in ivory in a Temple at Corinth.

From the ceiling were suspended smaller works of sculpture, as in the Sanctuary of Asclepios at Sykion; in the Temple at Mantinea the Stymphalian birds, made of wood or gypsum (also painted, since Pausanias could not determine their material), hung from the ceiling; in the Sanctuary of Hilaira Phoebe at Sparta was hung from the ceiling an egg enclosed by bands (the egg of Leda).

Thus the temple with its consecrated art works appeared as a museum, created by the piety of the people.

Interesting conclusions relating to the arrangement of the interiors of the temples are afforded by the "Delos inscriptions" published by Homolle (Bull. d. Corr. Hellen. 1890. p. 462-511) and interpreted by him. They first relate to the preservation of the temple vessels (repairs to vases, kettles, the soldering of a handle to a silver cup, to beakers, to shallow cups and the like), the purchase of a table for the Hieropois, several keys for the doors of the temple, then the insignia of a herald, clay pots or bowly for keeping silver or gold, cords, hooks, furthermore materials for beautifying the statues of the gods at festivals, on which occasions the altars must be purified, the statues washed and refreshed; old and new statues of wood and of stone must again receive polish and color on their surfaces. They were first washed with a sponge and a solution of saltpetre in water, then rubbed with oil or wax, with which was mixed a fragrant unguent (of roses), in order to make the material fragrant. For this cleansing of the statue of Artemis, for example, was required:-- sponge, 2 drachmas; saltpetre, 4 oboli; cloth and wax, 4 oboli; oil, 3 oboli; and for perfume, 5 drachmas (altogether 11 drachmas and 5 oboli). Complete conclusions relating to the internal arrangement of the temple will indeed be afforded by the further publication of the "Delos inscriptions", which relate to the entire series of chests among which the temple treasures were divided, and which state what was placed in the vestibule, in the cell

and in the opisthodome, what stood on the floor, hung on the wall, or was preserved in the chests, cases or special receptacles. By these indications shall we first obtain a complete idea of the internal equipment of a Grecian temple.

As temple vessels are to be mentioned the vases with purifying water placed in the vestibule (with which every one that would visit the temple must either sprinkle himself or be sprinkled by a priest, whereby he symbolically indicated, that he then approached the altar of the god with a pure heart) and the small altars placed in the cell before the divine statue for the bloodless offerings (the table of shewbread in the J Jewish temple). (Compare Fig. 213 from the finds at Delphi). (doubtful).

The latter were mostly made of stone (also frequently of wood), round, square or octagonal in form, adorned on their sides by the skulls of bulls, garlands of flowers and sacrificial knives, as proved by finds in Athens and on Delos. Pausanias remembered a silver altar in Mycenae. Of the different names employed for altars, "hesta, heschara, bomos", the latter is the usual one. In the most ancient times, these were of greater simplicity, artlessly built of stones or of sods; in Theocritus (26, 3 et seq.) women construct altars of brush and leaves, and according to Pausanias (9, 3, 4), the Boetians built a great altar of wood.

*Note. Compare Handbuch der classischen Altertumswissenschaft. Editor J. von Müller. Vol. 14. Die Griechischen Sakralheiligthümer und das Buhnenwesen der Griechen und Römer. By P. Stengel and G. Oemichen. Munich. 1880. p. 10-23, 63-106. Also Guhl, E. & W. Kroner. Das Leben der Griechen und Römer. Berlin. 1878. p. 57 and Fig. 42. (English translation in University library). -- Lastly, Stuart & Revett. Antiquities of Athens. Part 27, plate 12( drawing of a circular altar. Stuart found a circular altar at Athens), and part 28, plate 1 (the three sides of a polygonal altar decorated by the heads of bulls).*

As the highest and most venerated ornament, the statue of the god stood in a separate cell (aditon, as in the ancient temples of Sicily or the golden statue of Apollo at Delphi), or in the open space enclosed by low railings, before the rear wall of the middle aisle, its colossal dimensions often exten-

ankoding to the ceiling gleaming with gold, and no longer in accordance to the members and dimensions of the architecture around it. (According to Strabo, if the statues of the gods [illegible] endangered the roof of the temple). To this was added in cer-[illegible]

[illegible]

Museum at Athens.

[illegible] one of wool of Asservian weaving and Phoenician purple dyeing (that could be lowered to the floor) concealed the cryselech-[illegible] so safely deposited the state treasure; the opisthodome of the Parthenon was utilized as a place of deposit; the house of the dead was likewise not disturbed there -- the daughter of Autophoe was buried in the interior of the Artemesion at Phe-bes. (Indeed an exceptional case).

If the statues of the gods in the ancient period were often ariless images in stone, wood or metal, they rose in the best period to art works of the first rank: architecture and sculp-[illegible] standing on a high pedestal adorned by sculptures, the nude [illegible] the feet, on the breast being the ivory Gorgon's head, the Mi-[illegible] aid at her feet and beside the spear the dragon (Erichthonius), [illegible] a throne gleaming with gold, ebony and ivory, adorned [illegible] van, and constructed of gold and ivory, like the Athenian Pal-[illegible]

extending to the ceiling gleaming with gold, and no longer in proportion to the members and dimensions of the architecture around it. (According to Strabo, if the statues of the gods in Olympia could have risen from their seats, this must have endangered the roof of the temple). To this was added in certain temples the statues of the "associated gods," with the consecrated gifts at greater distances.

*Note. As a probable model of the statue of Pallas Athene in the Parthenon may be regarded the statuette in the Central Museum at Athens.*

Curtains generally concealed the precious statues of the gods, one of wool of Assyrian weaving and Phoenician purply dyeing (that could be lowered to the floor) concealed the chryselephantine statue of Zeus in Olympia. In the sacred place was also safely deposited the state treasure; the opisthodome of the Parthenon was utilized as a place of deposit; the repose of t the dead was likewise not disturbed there -- the daughter of Antropos was buried in the interior of the Artemesion at Thebes. (Indeed an exceptional case).

If the statues of the gods in the ancient period were often artless images in stone, wood or metal, they rose in the best period to art works of the first rank; architecture and sculpture competed in the temple for the palm. With the most splendid works belonged the chryselephantine statues of Phidias. Standing on a high pedestal adorned by sculptures, the nude parts of ivory, the rich garment of wrought gold extending to the feet, on the breast being the ivory Gorgon's head, the Nike (victory) on one hand with the spear in the other, the shield at her feet and beside the spear the dragon (Erichthonios), was represented Pallas Athene in the Parthenon -- the value of the gold of the garment was estimated at about $625,000. On a throne gleaming with gold, marble, ebony and ivory, adorned by painted and sculptured figures and the forms of gods, sat Zeus at Olympia, his head encircled by a garland of olive leaves, and constructed of gold and ivory, like the Athenian Pallas; on his right stood the likewise chryselephantine Nike; in his left was held the sceptre ornamented by an eable at its tip; the sandals shone with gold, and the heavy mantle was painted or ornamented with blooming lilies and small figures. (Com-

(Compare Fig. 208). But also simpler forms of less costly materials represented the gods, though often strangely opposed to our modern tastes.

Wooden statues were chiefly made in the ancient period, indeed of ebony (Temple of Apollo at Megara), cypress, cedar, pear (Heraion near Mycenae), oak, yew and lotus woods; only the image of the Cyllenic Hermes is said to have been carved from thion wood. Ivory and wood were later employed together, the latter being ornamented by gold and color, as shown by the statue of Athene in Aegira, whose face, hands and feet were of ivory, the other parts being of painted and gilded wood.

Also likewise occur statues entirely made of ivory, as for example, the statue of Aphrodite in Megara; a combination of wood and marble is shown by that of Apollo Chalinitis at Corinth, whose body was made of wood, while the face, hands and feet were of marble.

*Note. Lucian in his "Zeus Tragoides" permits Hermes to say of the gods:-- "Thou seest how those from Hellas are indeed graceful, beautiful and artistically shaped, but all are of marble or bronze; only the most costly are of ivory, merely with sufficient gold to receive color and polish; meanwhile these are also of wood and conceal within themselves entire hordes of mice, dwelling there."*

Small figures of cedar wood overlaid with gold were mentioned in the treasuries of Olympia, likewise an Apollo statue of beech with gilded head, and in Messene a statue of gold and P Parian marble. In Aegira, the Zeus statue was of Pentelican marble, and that of Pallas in Sparta was made of bronze.

The chryselephantine work may be carried back to about 580 B.C., and Dipoinos and Skyllis were the first artists in this kind. Many statues were also covered with temporary ornament. A temple statue in Sicyon wore a white woolen undergarment and a mantle over this; in Aegion a similar one was covered by a translucent veil. In other places the statues were further decked with garlands (in the Ino Sanctuary at Thalalä) or with myrtle twigs ("ermes statue in the Erectheion); in the Temple of Dionysos at Phigaleia, one could not see the lower part of the temple statue on account of laurel and ivy leaves; but so far as visible, it was painted with bright vermilion color.

Similar color ornamentation was exhibited by the entirely gilded Dionysos statuesin Corinth, whose faces were tinted red.

Oriental influences are recalled by some singular forms of gods, like the three-eyed (one eye in the forehead) wooden Zeus in Larissa, the statue in the Sanctuary of Eurynome at Phigaleia, which was a woman to the middle and then a fish. Directly opposed to and contradictory to the clear Grecian nature is the effect of the description of the statue in the cave of Demeter near Bassae; the wooden figure sat on a rock, had the form of a woman with a horse's head and a mane, wore a black undergarment extending to its toes, had on one side a dolphin, on the other being seated a dove.

The polychromy of the public buildings was also transferred to private structures in accordance with the same ground principles. (Compare Pompeii).

Division 7. The three orders of Grecian architecture in their formal development.

In the like sequence as for the technical construction of the building are also the elements of the Grecian orders to be considered according to their signification in form, and to be critically [illegible] with modern [illegible] [illegible]. The scheme of the temple must also here be taken as a basis, since in it the expression of form is most perfectly developed and most clearly apparent according to its importance. Their function is made clearly visible and is expressed by the applied ornament.

A. The Doric order.

The form expression is the same for the mixed and for the mere stone style of architecture; excepting that in [illegible] the stone have the final words. The profiles of the various [illegible] the intention of the artist, after [illegible] their stucco coating for structures of crystalline and hard limestone do not [illegible] the correct answer. The technical execution and [illegible] of the joining remains careful and similar, whether visible or concealed behind a coating of stucco. It should not [illegible] particulate, but the elements should act as a united whole [illegible] the mode of joining should not appear.

a. The stepped substructure, from which rise the columns and walls, remains without ornament, even when its courses were [illegible] in the earliest cases as school steps for use. Similarly [illegible] sublime with smooth surfaces.

b. The enclosing walls exhibit a [illegible] series of slabs, that projects but slightly beyond the rising masonry, either resting directly on the pavement, on plain or sometimes moulded [illegible] (Pasetum, Pastoforen, Thesaurus). The faces of the wall sublime are carefully dressed smooth, the joints are not accented (were-by the buildings of the Alexandrine period form an exception) and by the use of ordinary stone covered by a uniform coating of stucco, that could be left white or painted in varied colors.

Division 7. The three orders of Grecian architecture in their formal development.

In the like sequence as for the technical construction of the building are also the elements of the three orders to be determined according to their signification in form, and to be differentiated in accordance with their different natures. The scheme of the temple must also here be taken as a basis, since in it the expression of form is most perfectly developed and most clearly apparent according to its importance. Their function is made clearly visible and is expressed by the applied ornament.

A. The Doric order.

The form expression is the same for the mixed and for the smae stone style of architecture; excepting that in accordance with the mode of construction, the plasterer and the sculptor in stone have the final words. The profiles of the various structural parts of porous limestone afford no correct idea of the intention of the artist, after losing their stucco coating. Only for structures of crystalline and hard limestone do we obtain the correct answer. The technical execution and arrangement of the jointing remains careful and similar, whether visible or concealed behing a coating of stucco. It should not participate, but the elements should act as a united whole,and the mode of joining should not appear.

a. The stepped substructure, from which rise the columns and walls, remains without ornament, even when its courses were regarded in the rarest cases as actual steps for use. Simple rectangular ashlars with smooth surfaces.

b. The enclosing walls exhibit a high course of slabs,that projects but slightly beyond the rising masonry, either resting directly on the pavement, on plain or sometimes moulded plinths. (Paestum, Parthenon, Theseion). The faces of the wall ashlars are carefully dressed smooth, the joints are not accented (merely the buildings of the Alexandrine period form an exception) and by the use of ordinary stone covered by a uniform coating of stucco, that could be left white or painted in varied colors. A repetition of stone jointing in the plaster by incising or painting is unknown on temple walls, but is not excluded on the surfaces of the facades of dwellings (Pompeii). Men desi-

desired the effect of the surface without any lines, though h holding fast to the triple division of the wall in height. A moulded foot, cornice formed the upper termination, to which was added on the Parthenon the famous Panathenaic frieze, to this being joined beneath entirely purposeless regulae and drops.(Fig. [illegible]).

c. Doors and windows.(Openings in walls). Doorways are of rectangular or trapezoidal form. On no Doric temple is preserved a perfect doorway for the cell. The jambs of the doorways are frequently composed of similar courses of the cell walls extending to the opening, as such were previously shown at the doorway of the so-called Treasury of Athens, or by separately constructed plain jambs, that are interrupted by headers or adjacent lintels and are thereby connected with the masonry. [illegible] mination is always formed by a massive horizontal lintel.

Cavities in the jambs of the doorways of the Propylaea, as well as holes and pins in the lintels, permit the as[illegible] of a separate rich casing executed in marble or bronze and attached to them.[1] The doorway of a tomb in the Doric [illegible] Antiquities, among other examples, gives data on the treatment of the structure of the [illegible] (Fig. [illegible]. [illegible] ated pieces and with a richly sculptured profile, this surrounds the opening; ears on the lintel give to the whole a greater relief and expression; a crowning cap is decorated by [illegible] ornament and forms a further decoration.

Note 1. For bronze coverings, see Normand: Note du Metal dans la Construction Antique. Enc. de l'Arch. 1883. p. 81-83; Figs. 396-399; with the examples from the Museum at Avenches (Aventicum) there reproduced.

In no species of temple of the Doric order occur windows in the cell walls; on the unsymmetrical structure of Olympian Zeus [illegible] do peripteral building in the already mentioned works of Cockerell, [illegible] can no longer be verified at the ruins. (Compare Division 8; [illegible]).

In the last age of [illegible] first occupied the [illegible] and behind a row of columns, their

desired the effect of the surface without any lines, though h holding fast to the triple division of the wall in height. A moulded band cornice formed the upper termination, to which was added on the Parthenon the famous Panathenaic frieze, to this being joined beneath entirely purposeless regulas and dr drops.(Fig. 214).

c. Doors and windows.(Openings in walls). Doorways are of rectangular or trapezoidal form. On no Doric temple is preserved a perfect doorway for the cell. The jambs of the doorways are frequently composed of ashlar courses of the cell walls e extending to the opening, as such were previously shown at the doorway of the so-called Treasury of Athens, or by separately constructed plain jambs, that are interrupted by headers or adjacent lintels and are thereby connected with the masonry,(Compare Parthenon and Propyleion in Athens), while the upper termination is always formed by a massive horizontal lintel.

Cavities in the jambs of the doorways of the Propyleion, as well as holes and pins in the lintels, permit the assumption of a separate rich casing executed in marble or bronze and attached to them. [1] The doorway of a tomb in the Doric order at Antiphellos, among other examples, gives data on the treatment of the architrave of the doorway (Fig. 215). Recessed in several planes and with a richly sculptured profile, this surrounds the opening; ears of the lintel give to the whole a greater relief and expression; a crowning cap is decorated by anthemion ornaments and forms a further decoration.

*Note 1. For bronze coverings, see Normand; Role du Metal dans la Construction Antique. Enc. de l'Arch. 1883. p. 61-81; pls. 878-895; with the examples from the Museum at Avenches (Aventicum) there represented.*

In no species of temple of the Doric order occur windows in the cell walls; on the enigmatical structure of Olympian Zeus at Akragas, windows are given between the colunms of this pseudo peripteral building in the already mentioned works of Cockerell, Kinnard, Donaldson, Jenkins & Railton; the earlier finds can no longer be verified at the ruins. (Compare $ivision 8; Religious monuments).

On the left side of the Propyleion at Athens, in the building that contained the paintings and behind a row of columns, there

stands a wall, which is perforated by a door and two windows. [illegible] under Doric structures. The sills of these windows extend [illegible] under sill courses of Eleusinian marble of a bluish-black color, projecting but slightly from the face of the wall; the jambs are treated in the style of antae as narrow projecting leaves without bases, but have the complete capital of the large antae; a higher course of sabiars also extends clear across and forms the lintel, though it is not otherwise distinguished. (Fig. 218).

If the architraves of the doorways are already uncertain, there is a higher degree in the closing of the doorways. It was here of the same material, obliquely of wood covered with metal. At the Temple of Asclepios in Epidauros, according to [illegible] most exhibited ivory inlays as a special decoration. Vitruvius [illegible] sliding bronze panels, which opened outward. At the Temple of Asclepios on Tenos, Fabrenzeler is of the opinion, that the doorways were holes in the floor indicate hinges and fastening bolts. Still and jambs were covered with wood. The fixed ceiling with impossibly suited to the other famous fine details of the Temple.

[illegible]

[illegible] observed at a height of about 8.29 ft., from which it may be seen, that likewise here was executed no medium stone jamb.

[illegible]

In Delphi in E. course, a building of the 5 th century B.C. [illegible] are proves by the complaint of Ctesio against [illegible]

stands a wall, which is perforated by a door and two windows. We can at least see by this how the window was treated in secular Doric structures. The sills of these windows extend through from the side walls to the doorway as a plain rectangular sill course of Eleusinian marble of a bluish-black color, projecting but slightly from the face of the wall; the jambs are treated in the style of antes as narrow projecting bands without bases, but have the complete capital of the large antes; a higher course of ashlars also extends clear across and forms the lintel, though it is not otherwise distinguished. (Fig. 216).

If the architraves of the doorways are already uncertain, thus in a higher degree is the closing of the doorways. It should be assumed as proved, that the door frame and the leaves were of the same material, chiefly of wood covered with metal. At the Temple of Asclepios in Epidauros, according to the building contract, wooden doors were fixed on the exterior, that exhibited ivory inlays as a special decoration. [1] Vitruvius (Book IV, 6) states that in regard to Attic doors, they h had no lattice-work and also were not in two leaves; they exhibited hinged panels, which opened outward. At the Temple of Aphaia on Egina, Fürtwangler is of the opinion, that the doorways were closed by wooden leaves, simply beset by nails. Large holes in the floor indicate hinges and fastening bolts. Sill and jambs were covered with wood. The fixed railing with imposts and points elsewhere drawn by him is by its simplicity scarcely suited to the other famous fine details of the Temple.

*Note 1. Compare Baunack's Epigraphische Studie, Aus Epidauros. Leipzig. 1890.*

On the Tholos at Delphi (Marmaria), the doorway is still preserved to a height of about 3.28 ft., from which it may be seen, that likewise here was executed no moulded stone jamb, but merely arrangements in the ashlars, into which were fitted door frames and jambs of a different material. (Fig. 217, after my own sketch. April, 1906).

Famous were the doubel leaved doors of the Temple of Athena on Ortygia in Syracuse, a building of the 5 th century B.C. They are proved by the complaint of Cicero against Verres (IV, 55, 122 et seq.). According to the different measurements of

the Temple, now transformed into the Cathedral. The doors had
in two leaves, their leaves and frame certainly being of wood.
They bore splendid decorations of ivory and gold. Of gold ma-
re the regular rial heads, of ivory being the sculptures betw-
asnuets.[1] Without definite subdivision can scarcely be con-
ceived the door leaves of the larger temples, on account of t
to 28.3 ft., attaining one of nearly 32.5 ft. on the Parthenon.

[1] Thomson Comparative Philology in Mitrvin in A. Vol. 3. Chaps. 8 to 11. Leipzig. 1882. Varres carried off en-
on vases. Moreover silver and gold vessels, golden ornaments
set with precious stones, beautiful fabrics, purple stuffs, s
wool rings etc. Buchstein blames Rittorf in that he arrangeme-
ly represented and explained the steps with the fragments of
a quadrant-shaped prosus from the doorway of the Temple of in
Selinus, and he has carried the left angle block of the second
ster to the same level as the threshold, thus obtaining space
for extending the prosus to a quadrant. But Rittorf scarcely
had only ground for representing things otherwise, than he ca
them. So many things have changed in the lapse of time on Si-
cilian fields of ruins, that both gentlemen may be right. Ph-

Buchstein now adopts, basing it on his Tiele, folding doors
in four leaves with a very wide frame, behind which were con-
ceive the leaves. [illegible]
If in century to be before him, just as somewhat changed, it
[illegible]
forgotten, that for opening and closing the leaves pointe [illegible]
simple movements are made, that are indicated on the stone [illegible]
[illegible]
marks on the right are very questionable. The "metal [illegible]
by which are meant the perfect (metal ?) [illegible]
[illegible] the angles [illegible] rotates.

the Temple, now transformed into the Cathedral, the doors had the clear dimensions of 8.2 by 16.4 ft. Hence the doors were in two leaves, their leaves and frame certainly being of wood. They bore splendid decorations of ivory and gold. Of gold were the regular nial heads, of ivory being the sculptures between these, and to which belonged a Gorgon's head surrounded by serpents. [1] Without definite subdivision can scarcely be conceived the door leaves of the larger temples, on account of t the great height of the doorways, that vary in Sicily from 16.4 to 28.8 ft., attaining one of nearly 32.8 ft. on the Parthenon.

*Note 1. Compare Geschichte Siziliens im Altertum by A. Holm. Vol. 3. Chaps. 8 to 11. Leipzig. 1898. Verres carried off everything, so that only the bare leaves of the door remained. He further stole from all Syracusan temples the statues, beautiful Delphian marble tables, bronze mixing jars and Corinthian vases. Moreover silver and gold vessels, golden candelabra set with precious stones, beautiful fabrics, purple stuffs, s seal rings etc. Puchstein blames Hittorf in that he erroneously represented and explained the steps with the fragments of a quadrant-shaped groove from the doorway of the Temple C in Selinus, and he has carried the left angle block of the second step to the same level as the threshold, thus obtaining space for extending the groove to a quadrant. But Hittorf scarcely had any ground for representing things otherwise, than he saw them. So many things have changed in the lapse of time on Sicilian fields of ruins, that both gentlemen may be right. Their measurements lie about 70 years apart.*

*Puchstein now adopts, basing it on his finds, folding doors in four leaves with a very wide frame, behind which were concealed the leaves. One would believe an arrangement of the 18 18 th century to be before him, just as somewhat changed, it was common for the night shutters of the better living rooms in the Barocco period. The utility is clear, but it is then forgotten, that for opening and closing the leaves rather less simple movements are made, than are indicated on the stones m mentioned. The left is not sufficient, and the two beginning marks on the right are very questionable. The "metal bars", by which are meant the vertical (metal ?) bars before the wall, about which the entire apparatus rotates, are placed rather t*

*too far from the clear doorway, and are further not proved by anything. To make the two inner leaves free, there is first required a rotation of the entire box about 45 degrees; then only do they become free, when rotated in the opposed direction. Afterwards the apparatus must again be turned into the first direction, to make closing possible. What makes the matter intelligible is the strong projection of the stone jambs beyond the leaves. But the grooves for the general closing movement are wanting. The second one on the right has no significance for the assumption made. (Fig. 218).*

*Suggestions are favorably accepted and they are to be termed valuable, but they must be assured by indications on the building, for they are otherwise lost in the saying, which has unfortunately become too much the fashion:-- "How it was, I know not. Nothing of it exists any longer. But it might have been thus, according to my opinion; therefore it was so!" Thereon is it further based and opposed. Door leaves 32.8 ft. high, as tall as a wooden two-story dwelling, hung on hinges, built to securely close, can scarcely be assumed. What must have been the thickness of the wood for constructing them?*

*In his translation of Vitruvius (p. 118-119, Stuttgart.1865), F. Reber desires to understand by folding doors (valvae) an arrangement in two leaves, in which the two leaves are connected by hinges, only hung and swinging on pivots at one side. The remaining traces of movement do not prove this. They rather determine fixed pivots at both jambs. But he contributes to a better understanding of the dimensions in height, when he does not permit the "quatriforis" of Vitruvius (door in 4 leaves) to consist of four leaves beside each other. He divides the height, thus producing two leaves in each (four in all), each of which can be separately opened and closed. It is technically a possible and sound idea, which avoids the joiner's work of a door leaf 32.8 ft. high and 3.28 ft. wide.*

Likewise from marks left by the door leaves in moving over the floor, have men endeavored to determine the number of door leaves and their connection with each other, as well as the d direction in which they opened -- whether inward or outward. A properly swinging door leaves no traces of its movement on the floor. Only when its entire weight does not rest on the

supporting moulds, especially for very heavy doors (of metal or of oak), often recourse to the arrangement of "metal frames" on which hung the leaves (or their divisions) in overlaps and [illegible] — [illegible] to Pompeiian, digital experience this moment more particularly, also on glasses for later analogy: the leaf on a roller, and by this means allows the leaf to move on a curved metal track let into the stone. Whether this [illegible] the [illegible] or the leaf to be moved (Lemnian Prytaneion or Delphoi, Athens, Temples C and F in Selinus), indeed merely belong to a period, in which the original arrangement was no longer in use or existed.

5. [illegible] — [illegible] also [illegible]. The swelling echinus and square abacus transmit to the column the load of the architrave, and in the combination of both, art first finds time for play in the deeply cut series of leaves and the graceful moulding bound about it, the applied "[illegible]" the overlaid antemion band at the lower edge of the echinus. On the contrary, the burden-bearing abacus and the echinus remain without sculpture. Everywhere the sprouting life, the technical art of ornamentation, which the lofty spirit of the order strive off, to finally pass into pattern work. At first clumsy and strongly distinished upwards, then delicately determined unfolding in the ratio of the diameter to the height with a delicate curvature of the shaft (entasis), finally [illegible] even in details and said equipation of shaft and capitals.

"Everyone requires the diameter of the column to be 6 times into its height, exclusive of the capital, so that the "[illegible]" column may exhibit in building the proportions and the strength beauty of the masculine body." Neither in the early Doric [illegible] [illegible] 1/2, but this was exceeded in buildings of the late period, [illegible] [illegible] regarded as being in their proportions the minima and maxima of the Doric order. (Pliny. 36f, 95f).

The concave flutes (rhabdosis) animate the [illegible] [illegible] directly on the uppermost step of the [illegible]

supporting pivots, especially for very heavy doors (of metal or of oak), do men resort to the arrangement of "metal tracks, on which move the leaves (or their divisions) in opening and closing" -- according to Puchstein. Hittorf expresses this somewhat more practically, when he places the lower angle of the leaf on a roller, and by this means allows the leaf to move on a curved metal track let into the stone. Whether this arrangement was in use in ancient times, I leave undecided. The traces on the floor, which entirely result from a sinking of the leaf to be moved (compare Propyleion and Parthenon in Athens, Temples C and F in Selinus), indeed chiefly belong to a period, in which the original arrangement was no longer in use or existed.

d. The columns -- earth-born, rise powerfully upward, the swelling echinus and square abacus transmit to the column the load of the architrave, and in the combination of both, art art finds time for play in the deeply cut series of leaves and the graceful moulding bound about it, the applied rosettes or the overlaid anthemion band at the lower edge of the echinus. On the contrary, the burden-bearing abacus and the echinus remain without sculpture. Everywhere the sprouting life, the technical art of ornamentation, which the lofty spirit of the order strips off, to finally pass into pattern work. At first stumpy and strongly diminished upwards, then delicately determined uniformity in the ratio of the diameter to the height with a delicate curvature of the shaft (entasis), finally dryness in details and arid aspiration of shaft and echinus.

Vitruvius requires the diameter of the column to go 6 times into its height, exclusive of the capital, so that the "Doric column may exhibit in buildings the proportions and the sturdy beauty of the masculine body." Neither in the early nor in the best period is this proportion of 1 to 6 retained in Grecian works. (It varies from 1 to 4 to somewhat more than 1 to 5 1/2, but this was exceeded in buildings of the late period, as 1 to 6 1/2 in Nemea). The columns of Corinth and Nemea may be regarded as being in their proportions the minima and maxima of the Doric order. (Figs. 219, 220).

The concaeve flutes (rhabdosis) animate the shaft and commence directly on the uppermost step of the stylobate, [1] usually

terminating in a curved form beneath the volutes. The chamois [illegible] flat elliptical, oval, of semicircular form, according to [illegible] the lateral or median [illegible] [illegible] one each other in a sharp edge, equally delicate in succession [illegible] mouldings; only on one temple in Sodiums (?) are [illegible] fillets left between the flutes on a few columns. Vitruvius requires for their form the simple circular arc, described from the centre of a square constructed on the width of the line obtained in this way agrees in the fewest cases with those preserved on Greek monuments.(On a porous frieze in Acropolis in Athens, the flutes are similarly arranged.)

[illegible] in examining it [illegible] [illegible] on the uppermost step of the stylobate, where the flutes also see the front Greeks in Sicilian. Another [illegible] translation of Vanbiant-Holmy's Tetrapyrgos are [illegible]

Sixteen, eighteen and twenty (twenty four extremely select) [illegible] occurs on a few ancient monuments, and also on such as have [illegible] The last number is that common on Doric monuments of [illegible] The Parthenon in Olympia, with its columns having 20 flutes [illegible] ninety one with 12. As shown by the columns in Sunion, [illegible] smaller number of flutes is no evidence of a greater age of [illegible] monument. Flutes are found in some buildings, interrupted [illegible] one or more sections before they terminate, i.e., a [illegible] is partial. These irregularities never resulted from [illegible] chance, for otherwise, [illegible] [illegible] analogous produced similar practices, and these would [illegible] where found, the reasons on all are [illegible] of the Greek [illegible] columns. But no instances at all are consequently so regular [illegible] Ionic, Tetrastylos. Between [illegible] [illegible] of Vanbiant, Temple [illegible]

terminating in a curved form beneath the echinus. The channels have a flat elliptical, oval of segmental form, according to the material of which the columns are constructed, and intersect each other in a sharp edge, equally delicate in stuccoed and marble monuments; only on one temple in Selinus (S) are narrow fillets left between the flutes on a few columns. Vitruvius requires for their form the simple circular arc, described from the centre of a square constructed on the width of the flute as a basis, and touching the angles of the square; the line obtained in this way agrees in the fewest cases with those preserved on Grecian monuments.(On a porous fragment on the Acropolis in Athens, the flutes are spirally arranged.)[2]

*Note 2. An exception is made by an angle column of the so-called Artemesion in Syracuse with an inscription referring to Apollo on the uppermost step of the stylobate, where the flutes first begin above a plain base band 11 ins. high, bu a column of the Heraion in Olympia, and by a Grecian temple in Pompeii. Also see Die Stadt Syracus im Altertum. Authorized German translation of Cavallari-Holm's Topografica Archaeoligica di Siracusa by B. Lupus. Strasburg. 1887. p. 80, 288.*

Sixteen, eighteen and twenty (twenty four extremely seldom) such flutes surround the surface of the column; the first number occurs on a few ancient monuments, and also on such as belong to the late period (for example, the Temple in Sunion); the last number is that common on Doric monuments of all eras. The Heraion in Olympia, with its columns having 20 flutes, exhibits one with 16. As shown by the columns in Sunion, the smaller number of flutes is no evidence of a greater age of the monument. Flutes are found in some buildings, interrupted by one or more incisions before they terminate, i.e., a separate necking (hypotrachelion) is cut off by them but a little below the capital. These incisions never resulted from technical causes, for otherwise, similar original conditions must have everywhere produced similar practices, and these would be everywhere found, for example on all bed joints of the drums of the columns. But no incisions at all and consequently no separate necking of the column are found on the oldest sanctuaries in Assos, Cadacchio, Metapont, the Temple of Demeter and the Basilica at Paestum, Temple S in Selinus, the Artemesion at Syra-

Cyrene, the Temples of Concord and of Zeus at Akragas and Co-
ronia, only a single one is found on the great temple of Zeus
and Temples E and R in Selinus, the Poseidon-sanctuary in Cad-
modio, the Temple of Hermes in Akragas, the Insegna, Part-
enon and Propylaion in Athens; but one has two on Temple A in Se-
linus; three in Corinth, on the Temple of Poseidon in Paestum,
and on the Temples of Athena in Syracuse, on Delos and in Eri-
ssiaia, with even four on a propyl[illegible] or the Amphiaraion
in Athens. (Fig. 2d).

On a second fragment of a column with spirally arranged f
lutes at the last place, the recovered form at the necking is
also preserved, and it has the same shape as in case of vertic-
al flutes.

Before the broad expansion of the echinus is developed, and
especially in Corinth and Ionian monuments (one example also
on a [illegible] column at Lerna, [illegible]
flutes with an astragal, beneath which the flutes end abrupt-
ly, only in approximately semicircular form or rim corresp
ainingly rounded (compare Temple of Demeter and Persephone
Paestum). The such mentioned recurved leaves occupy the mid
the flutes reversed and enclosed by a small astragal, contrast
the lower roll-like mesh of the leaves to project even more
strongly in the form of an astragal. Above the series of lea-
ves is another half round moulding on the echinus, that a[illegible]
ding to some columns must be considered a beaded astragal.
There same above the circle of leaves an ascending anthemion
ornament or [illegible]. [illegible]
benchmarks of this part of the capital disappears in the rest
period and gives place to several annular rings (annulets),
which follow the outline of the echinus and protect from it
[illegible]
the lower edge of the lowest annulet this is then made wider
than the others. Three, four or five such rings occur above
[illegible]
above the plain concave moulding of ancient Ionian colum[illegible]
(Ionic - Eleusis). The annulets have but a single [illegible]

Syracuse, the Temples of Concord and of Zeus at Akragas and Olympia; only a single one is found on the great Temple of Zeus and Temples D and R in Selinus, the Fountain-sanctuary in Cadacchio, the Temple of Hercules in Akragas, the Theseion, Parthenon and Propyleion in Athens; but the two on Temple A in Selinus; three in Corinth, on the Temple of Poseidon in Paestum, and on the Temples of Athene in Syracuse, on Egina and in Phigaleia, with even four on a porous capital on the Acropolis in Athens. (Fig. 221).

On a second fragment of a column with spirally arranged f flutes at the last place, the recurved form at the necking is also preserved, and it has the same shape as in case of vertical flutes.

Before the broad expansion of the echinus is developed, and especially in Sicilian and Italian monuments (one example also in Tirins), there occurs a cove, into which the flutes either intersect or terminate (compare Selinus), or this is ornamented by a fully sculptured circle of leaves, finishing next the flutes with an astragal, beneath which the flutes end abruptly, only in approximately semicircular form or with corners slightly rounded (compare Temple of Demeter and Basilica at Paestum). Two such margined recurved leaves occupy the width of one flute. Some columns of the Basilicas have the ends of the flutes bordered and enclosed by a small astragal, causing the lower roll-like margin of the leaves to project even more strongly in the form of an astragal. Above the series of leaves is another half round moulding on the echinus, that according to some columns must be considered a beaded astragal. Others show above the circle of leaves an ascending anthemion ornament or interwoven bands (Fig. 222). This richly sculptu- treatment of this part of the capital disappears in the best period and gives place to several annular rings (annulets), which follow the outline of the echinus and project from it but slightly. The line of the end of the flute conicides with the lower edge of the lowest annulet; this is then made wider than the others. Three, four or five such rings occur above each other or are grouped together; but we also find annulets above the plain concave moulding of ancient Sicilian columns. (Compare Selinus). The annulets have but a slight projection

and width on the marble structures at Athens, and can only be directly executed in that material, or only in the stucco coating over coarse limestone. On the Temple of Poseidon in Paestum, we meet with a still further development of the terminations of the flutes. The edges are carried to the edge of the lower annulet and stop there quite abruptly; the form of the echinus then passes cup-like into the cylindrical form of the shaft, and the surfaces of the flutes intersect the cup-like surface in sharply drawn curves.

On the monuments of the older style, the echinus is a strongly projecting, flattened or convex, often weakly relaxed line, which in works of the best period becomes a tensely ascending and slightly projecting, nearly straight line with a quick inward curvature at the abacus; on those of the later era (as in Sunion, Nemea, and the Market Gate in Athens), the echinus shrinks to a delicate and refined, though somewhat effeminately appearing member; it is then bordered beneath by half bounds instead of annulets.(Compare the capitals found in the excavations between the Theatre of Dionysos and the Odeion in Athens). A tangent drawn to the curve of the echinus at its lowest point often scarcely makes an angle of 30° with a horizontal in ancient structures, while in those of the best period, this increases to one of 55°. (Fig. 223).

A square covering slab, the abacus, sometimes exceeding the echinus in height and sometimes inferior to it, projects very little or not at all beyond the greatest projection of the echinus and forms the termination of the capital; this has to make the transition from the circular to the rectangular form, to receive the horizontally supported structural members of the entablature, and to afford them a firm resting place. The echinus and abacus remain in all periods without sculptured ornamentation; small bordering or crowning mouldings first occurred on the abacus in the later period (compare capitals from Athens); sculptured decorations of the echinus are unique and are only to be found on the small Doric-like capitals above the head-cushions of the caryatids of the Ionic Erectheion, if may or should in a general way be included among Doric capitals.

Though sculptured ornament was excluded from these portions, decorations painted in colors and harmonising with the ornamen-

Ornamentation of other members were the more abundantly employed. Vestiges of painted ornamentation on the echinus and abacus of a Doric capital are no longer to be traced in any building, but its form may be learned from fragments of allied members and from paintings on vases. The echinus of the Ionic and caryatid capitals exhibits ovate leaves, partly sculptured and partly painted; the fret pattern occurs frequently enough on band-like members, so that both forms of ornament may be assigned to the members in question. Instead of the ovate leaves pointing downward (egg-and-dart moulding), the anthemion ornament is found in paintings on vases aspiring upward, so that an upward or downward pointing ornamentation symbolizes opposition, a crowning or a compression.

Semper recognizes in the oval leaves nothing more than a series of conventional unities, by which "above" and "below" are indicated in the form, while Bötticher everywhere holds them to be recurved leaves, half covering themselves.

On the strongly projecting capitals of Selinus and Paestum, the decoration of the echinus by recurved ovate leaves appears disproportionately coarse in comparison to the other ornamentation, even seeming monstrous.

The employment of decorative elements of opposed directions on the same architectural member may not be surprising, in so far as one is justified in regarding this form as compressed and as opposing this pressure. The anthemion and egg-and-dart ornaments also occur everywhere as decorations of the cymas of the pediment cornice (compare Parthenon and Propyleion in Athens), and on the same members are again found the upward aspiring and the descending ornaments.

On the Francois vase, two forms of Doric capitals occur on the Doric buildings painted thereon, one having a disk-like projecting echinus capital with rectangular abacus, the other with a pear-shaped transitional member and a moderate projection. Similar forms are found on other vase paintings of the earlier period, for example on the hydria in the British Museum (Fig. 225) and the vase with the women's bath.

The pear-shaped capitals preferably have been assumed to be inventions or fancies of the painter; but the evidence for t them in stone has been found in the steles or the supports

for consecrated gifts, which were discovered in the so-called Persian rubbish on the Acropolis of Athens, and which are now exhibited in the Acropolis Museum there. They are remarkable for the colored decoration of the abacus, here circular, by interlaced fret patterns, and of the cymatium by anthemions turned upwards and downwards. (Fig. 226). Bötticher's theory of the recurved leaf does not apply here.

As works of the late period are to be designated the forms of capitals from Priene, Myus and Athens. The abacus receives a crowning fillet; the annulets are changed into astragals.

The Cypriote capitals (see Golgos in Fig. 226) with their simple forms of the echinus must also be of high antiquity, and have likewise received their development in the same heavy manner in the Athenian marble stele capitals, excepting with the difference that the abacus assumes the circular form.

One of these Cypriote capitals (Fig. 226) exhibits grooves on the cyma extendind in a direction nearly normal to the profile. Similarly arranged are also the varied scale bands on the Athenian stele capital, whose colors are indicated, and whose abacus again exhibits the fret ornamentation. Other allied capitals show the recurved leaf on the echinus, as on the cushions of caryatids, or an aspiring palm decoration. [1]

*Note 1. We had already 25 years since mentioned the possibility of the decoration of the echinus with reference to the cymas of the Parthenon and Propyleion, but in consideration of Bötticher's theory, slight attention was paid thereto. Borrmann now states:- (Stelen für Weigeschenke auf der Akropolis zu Athen. Jahrb. Deutsch. Kais. Arch. Inst. Band III, p. 279, Berlin. 1888). "It may not be denied, that the ornament is very frequently in a quite loose relation to the structural form covered by it, and it is manifestly not in the ideal combination required by Bötticher's theory. The egg-and-dart m moulding is in some places without tectonic meaning, and the scale ornament is merely a covering decoration, but is nowise characteristic. The leaf wave that separates the lower from the upper row of leaves is distinctly separated from the recurved parts and makes it at least doubtful, whether we have to accept with Bötticher the origin of the Doric cymatium as a result of loading, with the points of a series of recurved*

*leaves."-- Consequently, the ornament does not appear to be intended to manifest the statical function of an architectural member, and it is then always arranged for a purpose, i.e., it closely adheres in development and direction to the movement of the profile.*

A third very ancient torus form of capital exists on the columns of the Lions' Gate and of the so-called Treasury of Treasury of Atreus in Mycenae. Between the square abacus and the round torus is attempted a preparation for the transition, but its form is not definite and clearly expressed, and the transition from the torus to the shaft of the column is made by a cove, covered by a row of leaves.

The row of leaves beneath the echinus (painted) is shown by the old capital of the column of the Tomb of Xenvares [2] and is sculptured on the capital from Paestum, where to the row of leaves are also frequently added anthemion ornaments or connecting bands (Fig. 226). In Mycenae, the entire torus was c covered by plaited and volute ornaments, while in Paestum only the lower portion of the strongly projecting echinus was decorated.

*Note 2. See Fig. 226; also Buchstein, Das Ionische Capital. 47 Program zum Winkelmannsfeste d. Arch. Ges. zu Berlin. Berlin. 1887. p. 47.*

The old capitals in Selinus likewise have the cove between the echinus and the shaft.

A widely projecting form of echinus (disk-like) is shown by the capitals of columns on archaistic vases (see in Fig. 226. a lecythos found in Athens), by the stele capital of Xenares, and after these, by the capitals of the oldest period in Paestum, Syracuse and Selinus.

The strong projection should be referred to an original rectangular form of capital, projecting on two sides only, as shown by the Athenian stele cap (Fig. 226), to which we have added a form from the Asclepion in Epidauros, certainly of a later period. The widely projecting echinus form of the narrow end of the capital is here undeniable, and it is technically justified after its use in Epidauros.

But in addition to the echinus, the cymatium also occurs as a characteristic part of the capital of the free column, ind-

incised above an octagonal or circular shaft (Fig. 222).[3] The abacus then corresponds to the form of the shaft and is correspondingly octagonal as well as circular, and the cymatium is a compression of the cove or ogee and the recurved leaves.

Note 2. See de Ras, Voyage archaeologique en Grece et en Asie-Mineure etc. Ken edition by S. Reinach. Paris. 1888. Ali-ro Jacobs Lamballer. Bud. by Zale. Deutsch. Arch. Inst. Berlin. 1888. Bl.49

The ogee or gear-shaped capital of the Francois vase and of the Athenian stele cap from the Persian rubbish has not certainly found acceptance in the stone architecture of the Greeks, just like the heavy torus of the Cypriote and of the corresponding stele base; but on the other hand, the disk-like form [illegible] until the time of Herodes.

The cymatium also -- the compound form -- was not accepted for the columns of the building, but indeed for crowning the [illegible] elements introduced from Asia Minor; in the shaft, we recognize the Egyptian stone column!

According to the stele cap found in the Persian rubbish,(Fig. 223), the assumption may well be permissible, that the Greeks had quite early replaced the wooden post by the stone pillar, and indeed before they introduced the massive stone columns of the Egyptians in their architecture. We have pointed out this primitive stone model for the capital and shaft of the Doric column, and in this,and not in the former, is to be [illegible] one.

That the Greeks stone structures were a direct imitation of wooden structures is justly contested by Hübsch, Mittlober, and Viollet-le-Duc, since this method would be opposed to reason.[1] One would make the same error by assuming the ancient Doric stone cathedrals to have been a direct imitation of exclusively wooden structures, as if it were desired to make it unmistakable,that they should have been primarily conceived as stone structures. If the ancient writers correctly mention old wooden columns in Greek sanctuaries, which were reputedly

indeed above an octagonal or circular shaft (Fig. 226).[3] The abacus then corresponds to the form of the shaft and is consequently octagonal as well as circular, and the cymatium is a connection of the cove or ogee and the recurved leaves.

*Note 3. See Le Bas. Voyage archaeologique en Grece et en Asie-Mineure etc. New edition by S. Reinach. Paris. 1888. Also Antike Denkmäler. Pub. by Kais. Deutsch. Arch. Inst. Berlin. 1889. Pl.29*

The ogee or pear-shaped capital of the Francois vase and of the Athenian stele cap from the Persian rubbish has not certainly found acceptance in the stone architecture of the Greeks, just like the heavy torus of the Cypriote and of the corresponding stele caps; but on the other hand, the dish-like form with the cove and leaves came into use and was retained almost until the time of Pericles.

The cymatium also -- the compound form -- was not apcepted for the columns of the building, but indeed for crowning the antes. In capitals of the early period, we therefore see elements introduced from Asia Minor; in the shaft, we recognize the Egyptian stone column!

According to the stele cap found in the Persian rubbish,(Fig. 226), the assumption may well be permissible, that the Greeks had quite early replaced the wooden post by the stone pillar, and indeed before they introduced the massive stone columns of the Egyptians in their architecture. We have pointed out this primitive stone model for the capital and shaft of the Doric column, and in this,and not in the former, is to be sought the original and the transitional forms from wood to stone.

That the Grecian stone structures were a direct imitation of wooden structures is justly contested by Hübsch, Bötticher, and Viollet-le-Duc, since this method would be opposed to reason.[1] One would make the same error by assuming the ancient Doric stone buildings to have been a direct imitation of exclusively wooden structures, as if it were desired to make it incredible,that they should have been primarily conceived as stone structures. If the ancient writers commonly mention old wooden columns in Grecian sanctuaries, which were gradually replaced by stone columns, both certainly had forms differing

that we have found in old wooden buildings on this side of the Alps) do not attain the diameter of 4.76 ft. required in the mentioned certainly had a different form.[2]

Note 1. Also see Simulacra. Part 2. p. 54.

Note 2. We cannot rise to a belief in wooden columns with slow capitals made on the potter's wheel, as Penger suggests in order to explain its forms. Portsche Sulgurkomie etc. p. 14. Berlin. 1922. -- If we transform the probable capitals on the bucrie mentioned into the circular form (Fig. 255 b), the one form. But if we assume a wooden cap, this interpretation may be regarded as satisfactory on both sides, and we are saved from an absurdity.

Those of the tree supports, as soon as they are regarded as the ends of walls, while those of half columns and of coupled columns are of normal form. (Fig. 1000).

The peculiarity is still to be considered in colonnades: that in a remarkable manner the Greeks realized for beauty did not fail to permit columns of entirely unlike form on the same building, frequently beside each other.

The model here premised on the Doric Heraion at Olympia (Fig. 227),[3] there may be placed in the foreground as the prec-

Apollo in Selinus with its columns 34.12 ft. high, where beside each other were arranged three different forms of columns

der thereto, since for 21 out of 54 columns, their forms are no longer to be determined.(See Fig. 228). the around plan a and elevation b with the forms of capitals, one of which belongs to the oldest period, with their small and rounded serveto between echinus and abacus; the other shows a processed cavetto, and the third has the straight form of echinus without

the procedure by which Eupatron artists transmuted a possible

from each other. The greatest measurements of wooden columns, that we have found in old wooden buildings(on this side of the Alps) do not attain the diameter of 4.26 ft. required in the Heraion at Olympia, for example. The ancient wooden columns mentioned certainly had a different form. [2]

*Note 1. Also see Dieulafoy. Part 2. p. 51.*

*Note 2. We cannot rise to a belied in wooden columns with clay capitals made on the potter's wheel, as Fenger suggests in order to explain its forms. Dorische Polychromie etc. p. 16. Berlin. 1886. -- If we transform the probable capitals on the hydria mentioned into the circular form (Fig. 225 b), there results a technically impossible and esthetically monstrous form. But if we assume a wooden cap, this interpretation may be regarded as satisfactory on both sides, and we are saved from an absurdity.*

The capitals of the antes showforms entirely different from those of the free supports, as soon as they are regarded as the ends of walls, while those of half columns and of coupled columns are of normal form. (Fig. 133).

One peculiarity is still to be considered in colonnades; t that in a remarkable manner the Grecian feeling for beauty did not fail to permit columns of entirely unlike form on the same building, frequently beside each other.

The model being premised on the Doric Heraion at Olympia ( (Fig. 227),[3] there may be paced in the foreground as the greatest example, Temple G, the colossal structure dedicated to Apollo in Selinus with its columns 54.12 ft. high, where beside each other were arranged three different forms of columns and capitals. Perhaps even a fourth and a fifth might be added thereto, since for 21 out of 54 columns, their forms are no longer to be determined.(See Fig. 228, the ground plan a and elevation b with the forms of capitals, one of which belongs to the oldest period, with thin shaft and rounded cavetto between echinus and shaft; the other shows a recessed cavetto, and the third has the straight form of echinus without cavetto of the latest period).

*Note 3. In Fig. 227 (2 and 3), we cannot refuse to exhibit the procedure by which Egyptian artists translated a possible*

[illegible] wooden architecture into stone, that is telerably [illegible] acceptable. A square block of hard wood with the width of [illegible] without the intervention of a "cache-lire" turned disk. This is a transition member from the cuttingfiecel shaft to the [illegible] ...

Although this frieze have been known very long (See Hittorf), before the occurrence of the same thing on the Heraion at Olympia, no one had the sublime idea, and thence to establish for Selinus a successive change of wood into stone columns, according to their disappearance and the changing fashion, until it finally appeared in Olympia! The erection of the Temple is referred to the middle of the 5 th century. The eastern half of the southern side has the smelled cavetto capital, the western half of the southern side has the steeply inclined capital with the cavetto, on the western side being the [illegible].

The otherwise freely treated intervals between the columns on some Doric temples and stoas were closed by parapet walls or grilles, as may be seen from the arrangements for fastening [illegible] to the shafts of the columns. A lower wall of moderate height between the columns of Temple C in Selinus were shown by Koldewey (Fig. 290).

Protecting walls between the columns, [illegible] it, high and built of thin courses of marble, are also determined in the Doric portico of the Market in Priene. (See Priene-Werk. s. 1021).

[illegible]

The sums of statues nearly 2½ ft. high -- nude marble figures, that with arms thrown back and in a stiff military attitude support entablatures blocks in the Olympion at Akragas. (Fig. 290).

These sculptures are part in severe archaic style. Regarding the locality of their introduction on the Temple, contrious differ. Formerly referred to the interior, Koldewey made the attempt to transfer them to the exterior, when be made use analogies of the architrave in courses, not detached but resting on the cell wall. Conceding this, there follows a lightin-

*precedent wooden architecture into stone, that is tolerably acceptable. A square block of hard wood with the width of the beam is inserted between this and the round shaft, but without the intervention of a "cake-like" turned disk. This is a transition member from the cylindrical shaft to the square abacus, a form of stone construction and not of carpentry.*

Although thes facts have been known very long (See Hittorf), before the occurrence of the same thing on the Heraion at Olympia, no one had the sublime idea, and thence to establish for Selinus a successive change of wood into stone columns, according to their disappearance and the changing fashion, until it finally appeared in Olympia! The erection of the Temple is referred to the middle of the 5 th century. The eastern half of the southern side has the swelled cavetto capital, the western half of the southern side has the steeply inclined capital with the cavetto, on the western side being the steep capital without a cavetto. (See the disignation in plan).

The otherwise freely treated intervals between the columns on some Doric temples and stoas were closed by parapet walls or grilles, as may be seen from the arrangements for fastening them to the shafts of the columns. Ashlar walls of moderate height between the columns of Temple F in Selinus were shown by Puchstein (Fig. 229).

Protecting walls between the columns, 8.07 ft. high and built of thin courses of marble, are also determined in the Doric portico of the Market in Priene.(See Priene-Werk. p. 191).

e. Besides the column and the pier, the Doric style also gives us the human figure as a form supporting a burden, in the shape of atlantes nearly 26,24 ft. high -- nude marble figures, that with arms thrown back and in a stiff military attitude support entablature blocks in the Olympeion at Akragas. (Fig. 230).

These sculptures are kept in severe archaic style. Regarding the locality of their introduction on the Temple, opinions differ. Formerly referred to the interior, Puchstein made the attempt to transfer them to the exterior, when he made them supports of the architrave in courses, not detached but resting on the cell wall. Conceding this, there follows a light-

well well, or the arrangement of such was juxtaposed to the pediment ends, similarly to the semicolumnated western facade of the Ionic temple.

Colonnal forms of satyrs (strongly restored), that supported cornices are here exposed in Greek marble -- four less-er each other --, are found in the Louvre Museum.(Fig.284).

lower fig. 285, from the Temple of the Foliage on Delos.

The entablature.-- the architrave (epistyle), friezes

per termination of the building.

To the following may be prefixed a representation (Fig. 286 a, b), which then recently recall, what a change must have been experienced from wooden architecture, based on the same structural system, in its transition to the stone form. Neither in construction nor in the external appearance of the two is a direct connection now to be recognized. The ceiling in the stone structure lies above the cornice, but on the contrary in wooden construction, it lies directly on the architrave only and alone in both wooden and stone construction exercise the same external appearance and the like structural procedure,with the same position directly above the free supports. The friezes and cornice have become ornamental accessories, no longer exhibiting a function with a structural reason, still further compulsory evidence of which is afforded by diversity in the method of execution and by decorative construction.

The front surface of the architrave is usually designed as exhibiting ornament. And yet one such architrave is executed or another terra cotta (Fig. 286, b). [illegible] can no longer be denied, but the stones has certainly [illegible] were. The fashions of bases or crystalline limestone was [illegible] 286, c, d).

lighting of the pseudoperipteral structure by windows in the cell wall, or the arrangement of such was limited to the pediment ends, similarly to the pseudoperipteral western facade of the Ionic Erectheion.

Colossal forms of satyrs (strongly restored), that supported cornices and were executed in Grecian marble -- four beside each other --, are found in the Louvre Museum.(Fig.231).

As an unusual crowning of a half column and pier by a Doric echinus capital and by the projecting body of a bull may be taken Fig. 232, from the Temple of the Bulls on Delos.

f. The entablature.-- The architrave (epistyle), frieze (triglyphon), and the cornice (geison) together compose the upper termination of the building.

To the following may be prefixed a representation (Fig. 233 a, b), which then repeatedly recalls, what a change must have been experienced from wooden architecture, based on the same structural system, in its transition to the stone form. Neithin construction nor in the external appearance of the two is a direct connection now to be recognized. The ceiling in the stone structure lies above the cornice, but on the contrary in wooden construction, it lies directly on the architrave, that solely and alone in both wooden and stone construction exhibits the same external appearance and the like structural procedure,with the same position directly above the free supports. The frieze and cornice have become ornamental accessories, no longer expressing a function with a structural basis, still further compulsory evidence of which is afforded by diversity in the method of execution and by technical construction.

The front surface of the architrave is usually designated as excluding ornament. And yet one such with scroll ornaments is determined on ancient terra cottas (Fig. 236, b). Similar ornament was also not refused on stuccoed buildings, but this can no longer be prowed, since the stucco has chiefly disappeared. On buildings of dense or crystalline limestone was found no ornament, or rarely such as must be designated as temporary or applied later, that is proved in the form of inscriptions or suspended trophies (weapons and shields). (Figs. 236, c, d).

An excellent is made by the ancient Temple at Abbos (Fig. [illegible] a), at which the front surface of the architrave is decorated by a continuous figure frieze.

The architrave is covered by a plain band with regulae and guttae beneath the triglyphs, that were covered only by painted ornament. The lower surface of the architrave is smooth, like its surface toward the cell wall, and it bears no ornament of any kind. In place of the taenia with regulae and guttae, there is generally only a plain band on the inner side of the architrave, or then projects somewhat beyond the frieze. The drops partly hang free and are partly in contact with the surface of the architrave, finally joined to the lattice. They are of cylindrical or conical form. (Fig. [illegible]).

Triglyphs and metopes compose the characteristic decoration, since the forms have nothing more to do with the construction in stone. To the regulae are added on the architrave corresponding the three channels in the frieze. There are two entire channels of triangular or semicircular cross section (det. [illegible] tom), with one or each angle. In the best period the channels are rectangular, ending at the top in [illegible] where the oblique surfaces of the channels [illegible] tion the outer terminal form. The resulting undercut (ancient) allows a stronger effect of shadow at the [illegible] of the channel. In the late period the upper ends are cut together and leveled. A bead-band with a band or beaded [illegible], comprehends only in front, crowns the triglyph. Faint [illegible] ed ornament is indicated on the metopes. Otherwise [illegible] surfaces and the channels are in a single color. (Fig. [illegible] a

A peculiar meaning by varied [illegible] occurs on the small [illegible] at Elenis. (Fig. [illegible] b).

Between these triglyphs are inserted the metopes [illegible] basic decoration by figure motifs, or sculpture [illegible] filling the entire space, or by [illegible] of terra c[illegible] [illegible], [illegible] Athens).

[illegible]

An exception is made by the ancient Temple at Assos (Fig. 236 a), at which the front surface of the architrave is decorated by a continuous figure frieze.

The architrave is crowned by a plain band with regulas and drops beneath the triglyphs, that were covered only by painted ornament. The lower surface of the architrave is wrought smooth, like its surface toward the cell wall, and it bears no ornament of any kind. In place of the taenia with regulas and drops, there is generally only a plain band on the inner side of the architrave, or that projects somewhat beyond the frieze. The drops partly hang free and are partly in contact with the surface of the architrave, firmly joined to the latter. They are of cylindrical or conical form. (Fig. 237).

Triglyphs and metopes compose the characteristic decoration, since the forms have nothing more to do with the construction in stone. To the regulas and drops on the architrave correspond the three channels in the frieze. There are two entire channels of triangular or semicircular cross section (Metapontum), with one at each angle. In the best period the channels are rectangular, ending at the top in gable or arched forms, when the oblique surfaces of the channels are extended higher than the outer terminal form. The resulting undercutting (scotia) gives a stronger effect of shadow at the upper end of the channel. In the late period the upper ends are cut rectangular and beveled. A head-band with a band or beaded astragal, projecting only in front, crowns the triglyph. Painted ornament is indicated on the band. Otherwise the front surfaces and the channels are in a single color. (Fig. 238 a).

A peculiar masking by varied emblems occurs on the small Propyleion at Eleusis. (Fig. 238 b).

Between these triglyphs are inserted the metope panels with their decoration by figure reliefs, by sculptured rosettes f filling the entire square, or by plates of terra cotta. (Epidauros, Thermos, Athens).

On the Temple with the ancient sculptures in Selinus, the spaces between the triglyphs are first shaped as flat recesses, enclosed by a sill resting on the architrave, two narrow side jambs and a lintel slightly projecting beyond them; the background forms a smooth vertical surface, from which rise

sculptures executed in high relief representing the deeds of Hercules, Perseus etc.(Fig. 239 a).

At other places, moulded bands (Phigaleia) or plain head-b bands crown the metope panels. The frieze extends simple and plain on the side toward the cell wall without painted or relief ornament, and it bears a projecting moulded and painted moulding as its termination.

As a beautiful example of rosettes as metope ornaments may serve that in Epidauros (Fig. 239 b, c).

The entire arrangement of the triglyph frieze is symmetrically transferred to the end walls of the pronaos and of the opisthodome, but is not continued along the longer sides of the cell.

An angle triglyph terminates the frieze (Figs. 240 a, b; front and diagonal views of the same in Phigaleia).

Otherwise, indeed also more thoughtful and better, appears the solution at the Parthenon, where instead of the triglyph frieze, the figure frieze is continued on all four sides, and which was retained in an allied manner on the Theseion likewise, but with the limitation to the two ends.(Figs 240 c, 241, 242, as well as a portion of the frieze of horsemen, from the original slabs in the British Museum, Fig. 243).

At the Parthenon were retained the regulas and drops beneath the frieze, which leads to the conclusion, that a triglyph f frieze was originally planned, but which was omitted during the construction. In place of the taenia with the regulas and drops, there occurs on the Theseion a painted ogee member beneath the frieze. Thus on one end the frieze and with it the architrave also is continued to the outer portico, but at the other it extends only to the antes of the cell wall.

The main cornice first consists of narrow slabs of rectangular cross section arranged beside each other, that project strongly beyond the triglyph frieze, and almost entirely conceal the same in depth -- thus terminating it and affording protection. The front surface is usually crowned by an ogee moulding at top, on which painted or sculptured wide and flat leaves are arranged; the crowning moulding is sometimes wrought in one block with the cornice, sometimes placed separately on it. It shows beneath a narrow and deeply undercut projec-

color, from which the slab is obliquely cut back to the iron surface of the frieze, thus lessening the weight of the overhanging portion and preventing the rain water from running back. The oblique surface is generally stopped against a vertical surface or band (see Parthenon, Theseion, temples in Selinus, Phigaleia and on Ægina), produced by undercutting, and that projects but little beyond the head-band of the triglyphs. This band is also reduced in height on some monuments, then ending in ogee form against the triglyphs. (See Propylaion in Athens, fragments from the former Parthenon Museum there and in the Museum at Palermo).

Corresponding to the triglyphs and metopes and of equal width with the former, the lower oblique surface of the cornice is covered by rectangular plates cut on it (mutules, vine), that are separated by incisions and ornamented by drops, three in depth and six in width (eighteen in all), cylindrical or conical pegs. These mutules abut against the vertical band (Parthenon etc), are joined together at the rear by narrow bosses (Propylaion in Athens), or they are cut entirely free and separated by incisions, lie beside each other on the inclined surface (see fragments from Athens).

The centre of each mutule coincides with the centres of the triglyphs and metopes. Since the mutules on most monuments are of equal width, but the metopes are wider than the triglyphs, the magnitude of the separating incisions depends on the difference in the widths of the metopes and triglyphs.

On earlier temples, for example [illegible] cornice at Selinus, the mutules over the metopes have merely half the width of the triglyphs and are based by only nine drops (Fig. 244). On poros (limestone) architecture on the Acropolis of Athens, the mutules have but two rows of drops in depth, and the mutules above the metopes have but four in [illegible].

One peculiarity is yet to be mentioned. At the places where the guard portico and the pinacotheke join the middle building [illegible] horizontal main cornice. There yet remain the regulas and drops of the triglyphs over the antes placed nearest the mid-

projection (fillet with water drip), always marked by strong color, from which the slab is obliquely cut back to the front surface of the frieze, thus lessening the weight of the projecting portion and preventing the rain water from running back. The oblique surface is generally stopped against a vertical surface or band (see Parthenon, Theseion, temples in Selinus, Phigaleia and on Egina), produced by undercutting, and that projects but little beyond the head-band of the triglyphs. This band is also reduced in height on some monuments, then ending in ogee form against the triglyphs.(See Propyleion in Athens, fragments from the former Bourbakeion Museum there a and in the Museum at Palermo).

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One peculiarity is yet to be mentioned. At the places where the guard portico and the pinacothek join the middle building of the Propyleion in Athens, the mutules are wanting in the horizontal main cornice. There yet remain the regulas and drops of the triglyphs over the antes placed nearest the mid-

middle building; the triglyph itself no longer exists. The head-band of the architrave and of the triglyphs is extended above the plain surfaces of the walls, and the still preserved crowning main cornice here consists of a deeply undercut cornice also crowned above by a small moulding, that is transferred to the vertical wall in ogee form, and reduced at a right angle, extends to the side wall of the central building. (Fig. 244). The present condition of the monument, the absence of the cornice blocks from the places mentioned, no longer permits recognition of how the transition from one moulding to the other was arranged.

The form of the main cornice resulted from practical needs. Besides doing the termination upwards of the walls, and protecting the lower richly decorated parts of the walls beneath, shuttering the sculptured and painted friezes from wind and weather, it must throw the rain water falling on the roof as far from the walls as possible, for which purpose were arranged the deep undercutting and the water drip. This principle is common to all three orders (Fig. 245). Extolling a purpose in beautiful forms is the final requirement in all parts of Greek architecture.

This main cornice is uniformly carried around on all four sides or the temple.Corresponding to the single triglyphs, it [illegible] on to each other, leaving in the corners of the narrow separating spaces, a square open area on the underside of the slab, that was decorated by a painted architrap ornament.

4. Over the main cornice rises at each end the pediment,as [illegible]

[illegible] house of the deity, that alone from also in its dignity on t[illegible] a protected recess enclosed by the strongly projecting cornice of the roof and standing firmly on the hold (horizontal) cornice. The deeds of gods and of heroes were represented in them; correspondingly was the spirit arranged and prepared by t[illegible]

[illegible] and the architect; his thoughts were diverted from external things, and he was himself confirmed in faith in the power of

middle building; the triglyph itself no longer exists. The head-band of the architrave and of the triglyphs is extended above the plain surfaces of the walls, and the still preserved crowning main cornice here consists of a deeply undercut cornice slab crowned above by a small moulding, that is transferred to the vertical wall in ogee form, and returned at a right angle, extends to the side wall of the central building. (Fig. 244). The present condition of the monument, the absence of the cornice blocks from the places mentioned, no longer permits recognition of how the transition from one moulding to the other was arranged.

The form of the main cornice resulted from practical needs. Besides being the termination upwards of the walls, and protecting the lower richly decorated parts of the walls beneath, sheltering the sculptured and painted frieze from wind and w weather, it must throw the rain water falling on the roof as far from the walls as possible, for which purpose were arranged the deep undercutting and the water drip. This principle is common to all three orders (Fig. 245). Satisfying a purpose in beautiful forms is the basal requirement in all parts of Grecian architecture.

This main cornice is uniformly carried around on all four sides of the temple. Corresponding to the angle triglyphs, at the angle of the cornice are found the mutules at right angles to each other, leaving in the planes of the narrow separating spaces, a square open area on the underside of the slab, that was decorated by a painted anthemion ornament.

g. Over the main cornice rises at each end the pediment, as the most expressive external decoration.

It receives the most prominent sculptured decoration of the house of the deity, that shone from afar in its dignity on t those approaching, entrancing both their eyes and souls, from a protected recess enclosed by the strongly projecting cornices of the roof and standing firmly on the bold (horizontal) cornice. The deeds of gods and of heroes were represented in them; unconsciously was the spirit aroused and prepared by t this exhibition in one bringing offerings, long before visiting the sanctuary; his thoughts were diverted from external things, and he was himself confirmed in faith in the power of

the deity by the view of the representation of his issue.

At the Parthenon was the birth of Pallas (Athena) on one of the pediments, on the other being represented the contest of Poseidon and Pallas.[1] On the Temple of Zeus in Olympia, the chariot combat of Pelops and of Oinomaos with Zeus as the great central figure between the champions was on one, on the other being the combat of the Lapithae and the Centaurs at the marriage of Peirithoos, where the hero Theseus saves any the combatant with his axe. In Troas was on one tympanum the Polydamas hunt, and on the other the combat of Achilles and Telephos. On the Heraion at Thebes, the tympanums were filled with the works of Praxitelas representing the labors of Heroclea. In Delphi, Artemis, Leto, Apollo and the Muses stood in the pediment; Dionysos with the Thyades adorned the rear tympanum. In Troia were battle scenes from the Trojan War -- Pallas protecting the corpse of Patroclus etc. (Fig.248).

Note 1. See Curtius, E. Die Standbilder der Giebelgruppen [illegible] arrangements for setting the figures, works of Praxiteles, rear forms in tympanums (Lucina), of Leptaeon and another rectangular:-- further the parthenon frescoes of Kointel's Amazonomus, Ilioa of Corres (in Antike Denkmäler etc. Vol. 1. p.5 and Pls. 6, 8 A. Berlin. 1891).

With extraordinary skill in the composition, wrought in the round, fitted into the enclosure. Standing figures in the middle, which are followed by bowed, kneeling and lying figures toward the ends of the pediment. Metal accessories and colors enhance the effect of the decoration in relief.

The simplest enclosure of the pediment is shown by the Me- [illegible] 27), with the plainest moulding of the horizontal and inclined cornices, and a tympanum without ornament and with a case for the possibility of leading away the rain water properly.

The oldest remaining relief and painted frieze ornamentation in a Doric pediment is shown by the poros (limestone) structures on the acropolis of Athens (now exhibited in the acropolis Museum), where the angles of the pediment are skillfully filled (Fig. 249) by the bodies of serpents, "the triple lotus-

the deity by the view of the representation of his deeds.

At the Parthenon was the birth of Pallas (Athena) on one of the pediments, on the other being represented the contest of Poseidon and Pallas. [1] On the Temple of Zeus in Olympia, the chariot combat of Pelops and of Oinomaos with Zeus as the great central figure between the champions was on one, on the other being the combat of the Lapithae and the Centaurs at t the marriage of Perithoos, where the hero Theseus drives away the centaurs with his axe. In Tegea was on one tympanum the Calydonian hunt, and on the other the combat of Achilles and Telephos. On the Heraion at Thebes, the tympanums were filled with the works of Praxiteles representing the labors of Hercules. In Delphi, Artemis, Leto, Apollo and the Muses stood in the pediment; Dionysos with the Thyades adorned the rear tympanum. In Egina were battle scenes from the Trojan War -- P Pallas protecting the corpse of Patroclus etc. (Fig.246).

*Note 1. See Sauer, B. Die Standplatten der Giebelbruppen am Parthenon. Antike Denkmäler etc. Vol. 1. p. 48-51 and Pl. 58 A, B, C. Berlin. 1891. (Particularly the sections on the arrangements for setting the figures, marks of fastenings, new forms in tympanums (patina), of western and eastern pediments):-- further the Parthenon drawings of Nointel's Anonymous, those of Carrey (in Antike Denkmäler etc. Vol. 1. p.2 and Pls. 6, 6 A. Berlin. 1891).*

With extraordinary skill is the composition, wrought in the round, fitted into the enclosure. Standing figures in the middle, which are followed by bowed, kneeling and lying figures toward the ends of the pediment. Metal accessories and colors enhanced the effect of the decoration in relief.

The simplest enclosure of the pediment is shown by the Megaron of Demeter near Selinus (Fig. 247, after Puchstein, p. 87), with the plainest moulding of the horizontal and inclined cornices, and a tympanum without ornament and with a care for the possibility of leading away the rain water properly.

The oldest remaining relief and painted figure ornamentation in a Doric pediment is shown by the poros (limestone) structures on the Acropolis of Athens (now exhibited in the Acropolis Museum), where the angles of thep pediment are skilfully filled (Fig. 248) by the bodies of serpents, "the triple long-

[illegible] modern, however [illegible]

There are larger preserved to us the figure decoration of the Temple of Aphaia on Ægina (originals in Glyptothek at Munich), that has experienced through Thorwaldsen a novel and interesting change in its exhibition. (See colored print on plates 104 and 105 in his work), further that of the Temple of Zeus at Olympia (see the originals in Museum at Olympia) and those technically most perfect, of the Parthenon, executed in white marble (originals in British Museum at London). In Olympia and Athens, the figures in the angles of the pediment are at smaller scale than the colossal forms in the middle of the pediment. Both have an unequal and less monumental effect in comparison with the composition on Ægina, which is alone correct, considered from an artistic standpoint; particularly in the unity of scale of the figures. However miraculously in the unity of scale of the figures. However miraculously and wonderfully in technical skill are to be prized the remains of figures on the Parthenon, they as little satisfy the requirements, that must be established for similar works in regard to repose and truth of harmonious proportions.

The capitals enclosing the pediment do longer show the same [illegible] water drips and oblique intersections, as well as also the [illegible] transferred to the symposium have indeed remained, but [illegible] and vine are wanting. In their places occurs on the Athenian porus (limestone) strongness a plain inclined surface or one painted with lotus flowers or flying birds (fig. 246, after Forssmannbaukunst, plates I and II, by Th. Wagand. Gasellschaft-Leipzig. 1901), for a projection of the cornice of 1.5M ft. -- The case is again different with the ancient marble building (the so-called Temple of Demeter) at Paestum. Dela-[illegible] of cornice on pediment and side entirely unusual on Doric monuments. Koldewey and Puchstein have treated the matter more definitely, backed by the find of an entire block of the [illegible]

[illegible] from the normal Doric cornice consists in this, that [illegible] ornamentation, but an ovolo decorated by foliage, that extends around the building. Over this and extending along the in-

tailed monster, generally called Typhon."

There are further preserved to us the figure decoration of the Temple of Aphaia on Egina (originals in Glybtothek at Munich), that has experienced through Furtwängler a novel and interesting change in its exhibition.(See colored print on plates 104 and 106 in his work), further that of the Temple of Zeus at Olympia (see the originals in Museum at Olympia) and those technically most perfect, of the Parthenon, executed in white marble (originals in British Museum at London). In Olympia and Athens, the figures in the angles of the pediment are at smaller scale than the colossal forms in the middle of the pediment. Both have an unquiet and less monumental effect in comparison with the composition on Egina, which is alone correct, considered from an artistic standpoint; particularly in the unity of scale of the figures. However highly and wonderfully in technical skill are to be prized the remains of figures on the Parthenon, they as little satisfy the requirements, that must be established for similar works in regard to repose and truth of harmonious proportions.

The cornices enclosing the pediment no longer show the same form as the horizontal main cornice. The projecting cornice, water drips and oblique intersections, as well as also the m members transferred to the tympanum have indeed remained, but mutules and vias are wanting. In their places occurs on the Athenian poros (limestone) structures a plain inclined surface or one painted with lotus flowers or flying birds (Fig. 249, after Porosarchitektur, plates I and II, by Th. Wiegand. Cassel-Leipzig. 1904), for a projection of the cornice of 1.54 ft. -- The case is again different with the ancient hexastyle building (the so-called Temple of Demeter) at Paestum. Delagardette (Paris, 1829) first gave information concerning a f form of cornice on pediment and side entirely unusual on Doric monuments. Koldewey and Puchstein have treated the matter more definitely, incited by the find of an angle block of the cornice.

The change from the normal cornice consists in this, that above the triglyph frieze a projecting slab does not form the termination, but an ovolo decorated by foliage, that extends around the building. Over this and extending along the in-

inclined pediment then begins a coffered and strongly projecting stone cornice, indeed once crowned by a terra cotta cyma. The coffered cornice is partly still in place on the pediment; the angle block was found and shows its continuation on the longer sides, but which could not follow the direction of the inclination of the roof, but was perpendicular to the vertical wall surfaces. (Fig. 250, after the restoration by Puchstein on his page 23).

"Examples are deceptive." According to later investigations, it is assumed for the temples in Selinus, that from the mutule cornice was laid another ashlar course, that was covered by terra cotta plates.

Puchstein repeats the section given by Dörpfeld and Cavallari (Fig. 251) for Temple C (page 103) in a somewhat modified form, when he places the gutter tile horizontally on the cornice slab, thus producing a neutral surface 3.94 ft. wide between the front and inclined covering tiles. Cavallari and Dörpfeld avoid this arrangement, when the former proceeds in a technically correct way by laying the covering part of the gutter tile sloping, thus making possible a rapid removal of the rain water, while Puchstein creates a not tight receiving gutter. Puchstein further extends this impossibility, transfers it to the pediment and there produces self-evident bent cymas (Fig. 251), basing this upon similar bends on some Phrygian rock-cut tombs of the ancient native style and on analogies to the later Treasury of the Geloans at Olympia.

The pediment cornices on all temples are crowned by "cymas" of stone or of terra cotta, that stop at the angles of the pediment and longer sides, but which are also frequently continued on the longer sides. On some and especially the older monuments are they flat and decorated by painted anthemion ornaments, on others being delicately carved in echinus or ogee form. (Fig. 253). Instead of the severe painted decorations, there occur on the later monuments, and especially on those of the Alexandrine period, scroll ornaments on the front surfaces executed in relief. (Figs. 254, 255; Temple of Asclepios in Epidauros and the Tholos near Delphi). With a straight upper edge in Delphi and a curved one in Epidauros. If the cymas extend along the sides, then the rain water is led away

through brightly colored lions' heads or funnel-shaped spouts, likewise painted. [1] If water gutters are lacking on the sides, then occur antefixas executed in marble or painted terra cotta as ornaments of the edge drip.

*Note 1. Fig. 232. Among the Hellenes, the lion had the symbolical meaning of the guardian of the spring; therefore from lions' heads with them also flowed the sacred water. These lions' masks as water spouts at the edge of the roof were first used by Butades, the Corinthian sculptor in terra cotta.*

The three angles of the pediment are particularly emphasized and characterized by sculptures of various kinds, for example as chimeras, fanciful animal forms, little figures, or ornamental compositions formed of scrolls and palm leaves, such as are also found as caps of grave steles.

According to Pausanias, there were in Olympia gilded prize vases on the cornices of the Temple of Zeus, with a gilded Nike (victory) exactly above the middle of the pediment, beneath whose figure was fixed a golden shield, on which was fastened the Gorgon Medusa in skilful workmanship with an inscription beneath it. On one of the treasuries is mentioned a shield above the apex of the tympanum. [1]

*Note 1. The recovered inscription on the stone base, that was set on the apex of the pediment and base of the shield of Tanagra. (See Arch. Zeit. 1882. p. 179-188). Figure acroterias on the ridge of the Temple of Delos are determined and arranged by Furtwängler. (See Arch. Zeit. 1882. p. 335-346).*

*See likewise the splendid middle anda angle acroterias in Pergamon (Pergamonwerk, V. Trajaneum) and on the Artemesion at Magnesia-a-M., and their reproduction in the art forms. The parts were tenoned together and also fastened by metal pins, or set on plinths (Magnesiawerk, p. 67). Remains of the marble acroterias of the Parthenon in the Acropolis Museum at Athens.*

Acroterias in volute form on early Doric buildings have only first become known recently. Found in the rubbish on the Acropolis of Athens, they were first published in "Antike Denkmäler", issued by the Kais. Deutsch. Arch. Inst. Vol. 1. Heft 5. Berlin. 1891.(Fig. 256 a).

The stone acroterias of the marble roof were preceded by

there it clear for the tile roof, and the latter by those of wood for the roof with wooden cornice. Examples of the latter are preserved to us in the Phrygian rock-cut tombs, in which the face-beams of the foremost pair of rafters extend far above the intersection at the apex, as we still see in the Tyrolese wooden houses, forming a characteristic decoration.

Little acroteria in solid circular form were already determined in 1868 by De Ras (Voyage archaeologique en Grece et en Asie Mineure. Paris. 1868); similar ones in terra cotta were published in 1882 in the German "Olympiawerk". Fig. 326 b.

Remains of the marble acroteria scrolls of the Parthenon are exhibited in the Acropolis Museum of Athens and were earlier made known by British publications: those of the Temple of Apollo [illegible]

with new finds and based on allied forms, that are exhibited in the National Museum at Athens and in the Louvre Museum. Figs. 326 and 325 give Furtwängler's restoration in comparison with the actual earlier condition as well as the recovered [illegible].

b. The stone ceilings of the geometric porticos imitate the wooden coffered ceilings with framework crossing at right angles, that are often stepped inside with cornice-like rectangular offsets, without the use of relief ornament.

In the Temple in Phigaleia the panels are the square coffers of wooden ceilings.

[illegible]

fore. Another reason for a later date of erection than that usually assumed, to which also correspond the Corinthian capital and the partly wider acroteria.

[illegible]

On the Tholos in Epidauros, the ground of the coffers is decorated by very, beautiful and freely wrought marble rosettes, the arrangements for fastening which are still recognizable

[illegible]

those of clay for the tile roof, and the latter by those of wood for the roof with wooden cornice. Examples of the latter are preserved to us in the Phrygian rock-cut tombs, in which the face-boards of the foremost pair of rafters extend far above the intersection at the apex, as we still see in the Tyrolese wooden houses, forming a characteristic decoration.

Middle acroterias in solid circular form were already determined in 1848 by Le Bas (Voyage archaeologique en Grece et en Asie Mineure. Paris. 1848); similar ones in terra cotta were published in 1882 in the German "Olympiawerk". (Fig. 256 b).

Remains of the marble acroteria scrolls of the Parthenon a are exhibited in the Acropolis Museum of Athens and were earlier made known by English publications; those of the Temple of Aphaia on Egina were completed by Furtwängler in accordance with new finds and based on allied forms, that are exhibited in the National Museum at Athens and in the Louvre Museum. Figs. 257 and 258 give Furtwängler's restoration in comparison with the actual earlier condition as well as the recovered base.

h. The stone ceilings of the enclosing porticos imitate t the wooden coffered ceilings with framework crossing at right angles, that are often stepped inside with echinus-like intermediate offsets, without the use of relief ornament.

On the Temple in Phigaleia the panels are the square coffers of unequal dimensions, alternating with those of lozenge form. Another reason for a later date of erection than that usually assumed, to which also correspond the Corinthian capital and the partly wilder sculpture.

Lozenge-shaped are likewise the divisions of the ceiling of the stone annular portico of the Tholos in Delphi (Fig. 1 156), where the ornaments are again merely painted.

On the Tholos in Epidauros, the ground of the coffers is d decorated by very beautiful and freely wrought marble rosettes, the arrangements for fastening which are still recognizable on the ceiling slabs.(Fig. 259).

The structural and formal treatment of the wooden ceiling of the cell is beyond our judgement, since all safe starting points for at are wanting. All attempts at restoration remain

[illegible]

[illegible] in the fragments of a Corinthian-Doric temple at Pesstum, where the capitals of the columns are like Corinthian, but the architraves and triglyph friezes are purely Doric with [illegible] Doric cornice with mutules and viae as a termination. The elevation, partly restored by Money and Mabstein, belongs to the late series of forms of the Italic-Italian mixed civilization. (Fig. [illegible]). On the north portico of the Market at Pricne is executed on the equilateral a rather modestly restrained mixture, where there only Tonic dentils are inserted between the triglyph friezes and the cornice.

k. The ornamentation of the Doric order curiously moves within a strictly restricted play of lines, in regularly arranged conventionalized foliage (heart and egg shaped leaves), in rosettes of beads and disks, in scroll work, palmettums and volute-like scrolls, wherein painting plays the leading part."

E. The Ionic Order.

The civilization of Assyria and Egypt had already been long developed for a long period before the forest covered abodes of western Asia and of the islands adjacent thereto could exhibit results in the domain of architecture, that proved a similar culture and intellectual development of their inhabitants, as in the countries first mentioned. Civilization had indeed proceeded very far in both centres of culture, when it first commenced to [illegible]

Peoples emigrated from these centres at an early date, and [illegible] by the favorably located plains of western Asia and [illegible] the islands.

Thiersch centuries before Christ, we see the Hellenian peoples of the 12 in ovaxsty undertaking commerce into western [illegible], [illegible] Hamosas [illegible] later still, a movement of the people from Asia toward Europe was reflected back from the neighboring European Greece [illegible] the Asiatic islands and coasts.

[illegible] and Semetic races met and mingled there, Assyrians and Mountians left their traces, the mobile Semites and the

more or less hypothetical.

i. A mixed Doric style of architecture has been preserved to us in the fragments of a Corinthian-Doric Temple at Paestum, where the capitals of the columns are like Corinthian, b but the architrave and triglyph frieze are purely Doric with Ionic dentils above them, which together have a Doric cornice with mutules and vias as a termination. The elevation, partly restored by Morey and Puchstein, belongs to the late series of forms of the Hellenic-Italian mixed civilization. (Fig. 260). On the north portico of the Market at Priene is executed on the entablature a rather modestly restrained mixture, since there only Ionic dentils are inserted between the triglyph frieze and the cornice.

k. The ornamentation of the Doric order chiefly moves within a strictly restrained play of lines, in regularly arranged conventionalized foliage (heart and egg shaped leaves), in r rows of beads and disks, in scroll work, palmatiums and volute-like scrolls, wherein painting plays the leading part.

B. The Ionic Order.

The civilization of Assyria and Egypt had already been highly developed for a long period before the forest covered shores of western Asia and of the islands adjacent thereto could exhibit results in the domain of architecture, that proved a similar culture and intellectual development of their builders, as in the countries first mentioned. Civilization had indeed proceeded very far in both centres of culture, when it first commenced to dawn in Greece and Asia Minor.

Peocples emigrated from these centres at an early date, attracted by the favorably located plains of western Asia and the fine climate.

Fifteen centuries before Christ, we see the Egyptian princes of the 18 th dynasty undertaking campaigns into western Asia, also Rameses the Great two centuries later, and two centuries later still, a movement of the people from Asia toward Europe was reflected back from the neighboring European Greece upon the Asiatic islands and coasts.

The Aryan and Semetic races met and mingled there, Assyrians and Egyptians left their traces, the mobile Semites and the people of Tyre and Sidon there carried on traffic with distant

pace in the interior and on the coast.

country necessarily received a peculiar stamp, but still lacked originality.

ne of wood and of stone: Syrian wood construction and Semitic stone construction are here found beside each other. The ancient wooden construction is proved by its imitations on the Syrian and Carian rock-cut tombs.

and irregular stones, the door and window frames, the ceilings and roofs, and even free pillars, were of wood, while the roofs were covered with mixed straw and clay, and later with burned tiles. The easily procured wood led to the use of sculptured ornament; its lack of durability required a protecting coating, which was in the form of a covering of color, as rich painting in striking hues, or it consisted of a covering of metal and terra cotta.

ern Asia, which bore the really half-timber structures for the warehouses and storehouses of Phoenician merchants built in stone and wood, or served to form or protect harbors and landings, and the mighty temple terraces of Jerusalem, still supply in their ruins eloquent evidences of the stone style of the Semites prevailing in western Asia at an early date. The element, to which these merchants owed their place and power, might, as well as the prevalence of the easier use of wood in the preparation of the equipment for traffic. In their chief settlements, and with reference to their business and the manner of their acquisition of the country, it became necessary to see that it afforded both materials in abundance.

Certain Cypriote buildings are likewise evidences of a mixed style of wood and stone, in which are found free wooden pillars between stone bases and capitals.

in Babylon, columns were made of palm trunks, which were covered with reeds and stucco and then painted. The Bible informs us, concerning the erection of the Temple and Palace of

races in the interior and on the coast.

Under such conditions, the art style that developed in this country necessarily received a peculiar stamp, but still lacked originality.

For building, there existed in this province a superabundance of wood and of stone; Aryan wood construction and Semetic stone construction are here found beside each other. The ancient wooden construction is proved by its imitations on the Lycian and Carian rock-cut tombs.

In the mixed construction, the walls were built of regular and irregular stones, the door and window frames, the ceilings and roofs, and even free pillars, were of wood, while the roofs were covered with mixed straw and clay, and later with burned tiles. The easily wrought wood led to the use of sculptured ornament; its lack of durability required a protecting coating, which was in the form of a covering of color, as rich painting in striking hues, or it consisted of a covering of metal and terra cotta.

The massive quays, terraces and stone rampart walls in western Asia, which bore the really half-timber structures or the warehouses and storehouses of Phoenician merchants built in stone and wood, or served to form or protect harbors and landings, and the mighty temple terraces of Jerusalem, still supply in their ruins eloquent evidences of the stone style of the Semites prevailing in western Asia at an early date. The element, to which these merchants owed their place and power, required massive and monumental fortifications against its might, as well as the prevalence of the easier use of wood in the preparation of the equipment for traffic. In their chief settlements, and with reference to their business and the manner of their acquisition of the country, it became necessary to see that it afforded both materials in abundance.

Certain Cypriote buildings are likewise evidences of a mixed style of wood and stone, in which are found free wooden p pillars between stone bases and capitals.

We learn from Strabo, that on account of the lack of stone in Babylon, columns were made of palm trunks, which were covered with reeds and stucco and then painted. The Bible informs us, concerning the erection of the Temple and Palace of

Solomon, that their foundations were "of costly stones, cut in the masons, hewn square with saws, on all sides, from the ground to the roof."

The king of the Jewish monarchy, relying in his superstition, instead in the Tyrian Hiram, sire the renowned "Temple" (we shall be not in Palestine--), for ibos however, there is [illegible] ians." He covered Temple and Palace with cedar wood, built "Cedar" partition walls, metaphorical strips the entire Temple with "Water Glass", transverse it with burned bricks and lime-work. "So that no stone could be seen." He then covered the wooden partition with pure gold, and carvings resembling trees, multiform cherubim, palms and flowers; the floors were covered in olive wood and overlaid with gold plates. The bronze-founder Hiram from Tyre, the son of a widow of the [illegible] tribe, made for the Temple, with their [illegible] Boaz, placed before the portico of the Temple, with their richly adorned bronze chapiters. He built his own Palace with "Cedar" columns; the ceilings were constructed of [illegible] ns and heavy beams. (Kings, V, 6; VI, 12, 15, 16, 18, 21, [illegible]).

Tyre was now [illegible] Hiram, and Tyre the [illegible] sia Minor lying north and northwest.

The original wealth of [illegible] was soon [illegible] sened in time by traffic in logs and lumber, by its use in building ships and structures, and by employment as fuel; no cedars, cypresses and sycamores were at command in ever lessening quantity.

Those [illegible] the last of [illegible] of this building material, in time permitted the richly adornant and more resistant stone to become more prominent, at first for structures serving for more important purposes, and in this way the mixed mode of building gave place to the more nearly of stone. Meanwhile wooden columns were set on stone bases, that raised them above the damp pavement and thus protecting [illegible] ing, before they gave place to stone pillars, to which the

Solomon, that their foundations were "of costly stones, cut to the square, their wood-work sawn with saws, on all sides, from the ground to the roof."

The king of the Jewish people, skilled in stone construction, turned to the Tyrian Hiram with the request; "Command that cedars be cut in Lebanon---, for thou knowest, there is none among us, who is skilled in hewing wood, like the Sidonians." He covered Temple and Palace with cedar wood, built "cedar" partition walls, wainscoted within the entire Temple with "cedar alone", ornamented it with turned knobs and flower-work, "so that no stone could be seen." He then covered t the wooden portions with pure gold, had carvings executed thereon, sculptured cherubim, palms and flowers; the doors w were carved in olive wood and overlaid with gold plates. The bronze-founder Hiram from Tyre, the son of a widow of the tribe of Napthali, cast for him the two columns Jachin and Boaz, placed before the portico of the Temple, with their richly adorned bronze chapiters. He built his own Palace wi with "cedar" columns; its porticos were constructed of columns and heavy beams. (Kings, V, 6; VI, 10, 15, 16, 18, 21, 29, 32; VII, 6, 9, 15).

What has been deduced for Cyprus and the Asiatic coast eastward thereof, may indeed be assumed also for the coasts of Asia Minor lying north and northwest.

The original wealth of the country in wood was somewhat lessened in time by traffic in logs and lumber, by its use in building ships and structures, and by employment as fuel; mo moreover irrational or defective cutting thinned the forests; cedars, cypresses and sycamores were at command in ever lessening quantity.

These circumstances, combined with the lack of durability of this building material, in time permitted the richly abundant and more resistant stone to become more prominent, at first for structures serving for more important purposes, and in this way the mixed mode of building gave place to one more nearly of stone. Meanwhile wooden columns were set on stone bases, that raised them above the damp pavement and thus protected them from dampness, or they received a protecting coating, before they gave place to stone pillars, to which the

character of the former was transferred in both form and pro-
[illegible]

[illegible] roof there first gave place to that with rafters or the gable
[illegible] the columns, and the wooden abacus over them, to the volute
capital. But these changes were not perfected before Ionia
entered into closer relations to Greece, before it was incor-
[illegible] the Tomb of Amyntas is not considered earlier than 400 B.C.,
and it cannot be assumed to be a later addition.

[illegible] tions of the living, and in accordance with this law, the well
built wooden cabin, as slavishly imitated in the rock-cut
tombs in even the smallest detail (both in relief as well as
if detached), prevailed, and with it wooden construction also.
Its structural elements were recognized on the tombs at the
same time by Niemann and Dieulafoy (1884) and were technically
[illegible] corbelled out at the ends and over the round ceiling beams,
the tier for preventing the sliding of the terrace roof, cov-
ered with rubbish and straw mixed with clay.

[illegible] of these monuments by Benndorf, Niemann, Petersen, von Luschan,
[illegible] tombs cannot therefore be longer regarded as a transition st
[illegible] "will not be annulled thereby, scarcely be perceptibly lessen-
ed, but rather assured in the chief matter. They remain as
[illegible] though not as originals, but rather as indirect copies."

character of the former was transferred in both form and proportions.

The date of the completion of the innovation can scarcely be accurately determined here; how it was completed may be s seen on Lycian and Carian rock-cut tombs. The ancient terrace roof there first gave place to that with rafters or the gable roof; the closely set round trunks were replaced by squared timbers set farther apart; the old wooden pillars yielded to the columns, and the wooden abacus over them, to the volute capital. But these changes were not perfected before Lycia entered into closer relations to Greece, before it was incorporated in the Ionic satrapy (515 B.C.). The inscription on the Tomb of Amyntas is not considered earlier than 400 B.C., and it cannot be assumed to be a later addition.

As repeatedly explained, the tombs represent the habitations of the living, and in accordance with this law, the well built wooden cabin, as slavishly imitated in the rock-cut tombs in even the smallest detail (both in relief as well as if detached), prevailed, and with it wooden construction also. Its structural elements were recognized on the tombs at the same time by Niemann and Dieulafoy (1884) and were technically explained, when they pointed out in the triple series of beams corbelled out at the ends and over the round ceiling beams, the tier for preventing the sliding of the terrace roof, covered with rubbish and straw mixed with clay.

The erroneous ideas of Semper can no longer be held, that the Lycian rock-cut tomb is to be regarded as a monumental funeral pyre, and to which he adhered for a time, in consequence of the preceding statement and of the most recent examinations of these monuments by Benndorf, Niemann, Petersen, von Luschan, as well as the conclusions and comparisons with ancient Persian architecture by Dieulafoy.[1] The temple facades of Lycian tombs cannot therefore be longer regarded as a transition st stage of Ionic stone architecture. Their value to art history "will not be annuleed thereby, scarcely be perceptibly lessened, but rather assured in the chief matter. They remain as proofs of an early phase of the development of the Ionic style, though not as originals, but rather as indirect copies."[2]

other by fillets, crowned by the volute capitals as shown, and spaced uniformly and further apart, but set vertically; a plain frieze or one sculptured with figures, without architectural breaks; a simple projecting cornice with deeply undercut water-drip, and which sometimes rests on the well known so-called dentils, the placing of the beams of the portico o ceiling directly on the architrave.

A frequently added criterion, "a wider and lighter architrave, columns farther apart and more slender," is only true in regard to the Ionic Lightness of the Doric and the slenderness of the latter. On the boldest Ionic temple, that of Apollo Didymeos in Miletus, the columns stand closer between o in the Peloponnesus, that in Corinth, is equal to that of t Ionic columns in the Athenian Propylaea (fig. [illegible]).

As already shown, the earliest knowledge of the countries of Asia Minor and of the adjacent islands extends back to the middle of the second thousand years B. C.; the earliest very simple architectural productions must indeed have been of ma-

*Note 1. See Benndorf & Niemann. Reisen in Lykien und Karien. Vienna. 1884. Also Petersen & von Luschan. Reisen in Lykien, Milyas und Kibyratis. Vienna. 1889.*

*Note 2. See Benndorf. p. 118.*

To a preceding mixed stone and wood construction must the perfected stone structures of the Ionic order owe their origin, as explained for the Doric order, with the difference, that in transforming the slender proportions of wooden structural elements, these were also allowed to prevail in stone construction as well. With a change in general, the parts resting on the columns could be retained in their original functions, when the new stone ceiling was also permitted to rest on the architrave and was not raised to the height of the cornice, as in Doric stone construction, its former location being only decoratively indicated still in the frieze. (Fig. 261).

The characteristic peculiarities of the new order are then;- slender columns standing on separate richly moulded bases and accented by vertical semicircular flutes separated from each other by fillets, crowned by the volute capitals as shown, and spaced uniformly and further apart, but set vertically; a plain frieze or one sculptured with figures, without architectural breaks; a simple projecting cornice with deeply undercut water-drip, and which sometimes rests on the well known so-called dentils, the placing of the beams of the portico c ceiling directly on the architrave.

A frequently added criterion, "a wider and lighter architrave, columns farther apart and more slender," is only true in regard to the greater lightness of the former and the slenderness of the latter. On the boldest Ionic temple, that of Apollo Didymeos in Miletus, the columns stand closer between c centres, than at the middle interval of the Doric Propyleion in Athens; the intercolumniation of the heaviest Doric temple in the Peloponnessus, that in Corinth, is equal to that of t the Ionic colonnade in the Athenian Propyleion.(Fig. 262).

As already shown, the earliest knowledge of the countries of Asia Minor and of the adjacent islands extends back to the middle of the second thousand years B. C.; the earliest very simple architectural productions must indeed have been of na-

native origin; these later experienced changes and a higher perfection of form in Ionic, Corinthian and Corinthian tendences and the addition of Greciar elements.

Thus the case does not seem to indicate to the period of Alexander or that of the Diadochoi, with the exception of the isolated Ionic and Doric products there. Such itineral criticisms only under Roman rule. Only on Corinthian soil is Attic Ionic are preserved still for us a number of Imperial treasures from the best period of Hellenic art, although in ruins; in lower Italy and Sicily on the east with mostly sandy remains, some centials of porous limestone (Locri, Solunto).

Most noteworthy of this amalgamated style exhibit the preserved Doric style; there are Ionic entablatures with cornices on costiuds.

The monuments of this style were established with the first Hellenic influence and the influence of Hellas, but sufficiently proved by vestiges and by traditions.

Tiryns, Mycenae — Delphi — Olympia, the temples were in all possible dimensions. Even the smallest construction, the temple of Nike Apteros at Athens to the gigantic structures of Miletus and Ephesus. The same forms were employed at the small as at the large scale, just as was the case in the Doric order (Ionic, 3rd).

Transmission was the country in which Hellenic and Hellenistic civilizations most intimately combined. The information given by the Bible concerning the arrangement of Solomon's Temple must therefore accord in a higher degree with the Asiatic Ionic temples, than with the Hellenic Doric ones previously described.

Finally, if we consider Braun's axiom, that "the Ionic style resembles in elements the Asiatic, for the air-easy the common style of Asia at an ancient date, not to be computed, -- it is a powerful style, whose envoys may be traced into Asia Minor, along the Phoenician coasts to Carthage, and even into innermost Africa," we may reject the Vitruvian fable of the invention of this style (Book IV, Chap. 1) and his explanations of the volutes as curled tresses of women's hair and of the flutes as the folds of garments.

native origin; these later experienced changes and a higher perfection of form by Phoenician, Assyrian and Egyptian influences and the addition of Grecian elements.

What has come down to us belongs to the period of Alexander or that of the Diadochides, with the exception of the included Lycian and Carian rock-cut tombs. Much likewise originated only under Roman rule. Only on European soil in Attic lands are preserved still for us a number of charming creations from the best period of Hellenic art, although in ruins; in lower Italy and Sicily do we meet with merely scanty remains, some capitals of porous limestone (Locri, Solunto).

Most monuments of this architectural style exhibit the perfected marble style; rarer are limestone buildings with stucco coatings.

The monuments of this style were embellished with the gleam of rich gilding and the splendor of colors, as sufficiently proved by vestiges and by traditions.

Without change or variation of details, the temples occur in all possible dimensions, from the smallest chapel-like Temple of Nike Apteros at Athens to the gigantic structures of Miletus and Ephesus. The same forms were employed at the small as at the large scale, just as was the case in the Doric order likewise.(Fig. 263).

Western Asia was the country in which Semetic and Hellenic civilizations most intimately combined. The information given by the Bible concerning the arrangement of Solomon's Temple must therefore accord in a higher degree with the Asiatic Ionic temples, than with the Hellenic Doric ones previously described.

Finally, if we confirm Braun's axiom, that "the Ionic style belongs to Nineveh, perhaps even to Babylon; for its was already the common style of Asia at an ancient date, not to be computed, -- it is a powerful style, whose envoys may be traced into Asia Minor, along the Phoenician coasts to Carthage, and even into innermost Africa," we may reject the Vitruvian fable of the invention of this style (Book IV, Chap. 1) and his explanations of the volutes as coiled tresses of women's hair and of the flutes as the folds of garments.

The substructure (stylobate) in Attic Ionic monuments

consists of 3 steps, either of plain form as in most Doric a structures, or more richly treated by a recession, as on the little Temple of Nike Apteros in Athens (Fig. 294). We generally find higher substructures in temples in Asia Minor, as in her models in Inner Asia. On the Temple of Neseneris, for example, these were arranged in 5 steps, at Ajnani in 7, and on the Artemesion in Ephesus in 10.

Overstures on the substructures have never yet been determined on Ionic temples. The Athenian are free from such, and only on the Ionic temples on the theatre terrace at Pergamon may such be recognized.

[illegible]

[illegible] ness; they are terminated or crowned at top by a cap, that in part shows the members of the ante capitals.

The walls are not inclined but are strictly vertical and a [illegible] ends the same mode of working as the sabiers of Doric monuments, and which are connected together in the [illegible] Cornelly and Grun I-beams.

[illegible] the external surface, the height of the corresed sabiers is to their lengths as 1 to 2.7 or 3.

The lowest course is in Athenian buildings higher than the others, just as in Doric (see Parthenon, Theseion, Pseston, [illegible]

[illegible]

the Temple at Miletus.

[illegible] generally of unequal width on the different sides (see Temple of Nike). The slightly projecting wall ends or antes, described in the Doric style, likewise occur here and are opposite the external or intermediate columns, or they increase to be [illegible] and on the charming carvatid portico in Athens.

[illegible]

consists of 3 steps, either of plain form as in most Doric s structures, or more richly treated by a recession, as on the little Temple of Nike Apteros in Athens (Fig. 264). We generally find higher substructures in temples in Asia Minor, after models in inner Asia. On the Temple of Magnesia, for example, these were arranged in 5 steps, at Aizani in 7, and on the Artemesion in Ephesus in 10.

Curvatures on the substructures have never yet been determined on Ionic temples. The Athenian are free from such, and only on the Ionic temples on the theatre terrace at Pergamon may such be recognized.

b. The outer walls do not rest directly on the pavement of the portico, but on a continuous richly moulded base, whose section is usually imitated from that of the bases of the columns; they are terminated or crowned at top by a cap, that in part shows the members of the ante capitals.

The walls are not inclined but are strictly vertical and a are built of coursed stones, that exhibit on their beds and ends the same mode of working as the ashlars of Doric monuments, and which are connected together in the same manner by dowells and iron I-cramps.

On the external surface, the height of the coursed ashlars is to their lengths as 1 to 2.7 or 3.

The lowest course is in Athenian buildings higher than the others, just as in Doric (see Parthenon, Theseion, Paestum, and others), and it projects 3/8 inch from the wall surface at the Erectheion. The fillet with the apophyge is there cut on this course (265).

Decoration of the wall surfaces by pilasters in the interior is not excluded, as for example, is shown by the walls of the Temple at Miletus.

The angles are specially accented by small projections, frequently of unequal width on the different sides (see Temple of Nike). The slightly projecting wall ends or antes, described in the Doric style, likewise occur here and are opposite the external or intermediate columns, or they increase to become massive piers, as on the north portico of the Erechheion and on the charming caryatid portico in Athens.

c. Doors and windows exhibit openings of vertical rectang-

in form and proportions, one of the most beautiful doorway enclosures of all times.(Fig. 287).

rectangular or trapezoidal shape. The sides of the former either consist of plain vertical piers, which like antes are c crowned by capitals and are connected at top by a plain lintel (Fig. 266), as for the doorway of the caryatid portico, or richly moulded jambs and lintel enclose the opening, as at t the doorway of the north portico of the Erectheion. A broad band, decorated by flat rosettes similar to those usually occurring on Assyrian tombs [1], is the principal member of the architrave of the last doorway, and it is recessed toward the opening in moulded ogee bands ornamented by leaves. The rosettes on the bands of the jambs have instead of the low calixes deeply drilled holes, that may have served for fastening a movable ornament. It is singular to find in the midst of the exquisite and marvellously executed sculpture the setting bosses remaining below the round rosette of the left jamb. On the right and left of the lintel project from the wall magnificently wrought volute-consoles, models in design and execution, and they receive the cap, which consists ofcornice, carved lower member (egg-ant-dart-moulding) and the cyma ornamented by anthemions; these parts compose in construction, in form and proportions, one of the most beautiful doorway enclosures of all times.(Fig. 267).

*Note 1. See Dieulafoy. Vol. 2. p. 21. Already at Mycenae was the doorway to the recently more carefully explored second "Tholos" similarly enclosed. See Eph.Arch.1891.Pl. 1.*

A similar treatment is also found on one of the Ionic Rock-cut facades of tombs in Telmissus; instructive there is the false bronze or wooden door with its architrave, panels, knobs and nails, imitated in stone.

Another rock-cut tomb in Antiphellos shows the architrave of the door with the strongly marked, so-called "ears", with an ogee moulding extending around it and with three bands, a treatment that we meet with again on the windows of the western side of the Erectheion, in simiplified and ennobled form. (See Figs. 261, 266).

It is worthy of note, that in all the cases mentioned, the mouldings are carried down to the base or sill and are not r returned or extended horizontally.

The Ionic monuments of the Alexandrine period, like those originating under Roman rule, all show richly moulded and decorated frameworks with projecting roofs. (See Pergamonwerk. Vol. 4. Pl. 39. Jamb of the Ionic Temple, the Artemesion built about 220-225 B.C., the Temple of Zeus at Magnesia, the Asclepion and the Temple of Demeter at Priene etc.).

From the earlier period, the Treasury of the Cnidians (?) at Delphi gives an interesting example of a richly ornamented doorway enclosure with a roof supported by consoles. These consoles have but one volute and thus are less richly shaped than those of the Erectheion (Fig. 268). Their front surfaces are less elegantly formed; they exhibit the singularly short rounds on the front angles. (Also see the drawing of the corresponding fragments in Perrot & Chipiez, p. 649).

A doorway with roof on two consoles of indeterminate form is to be found on an Ionic marble relief of an altar of Apollo and the Nymphs on Thasos (now exhibited in the Louvre) -- "belonging to the period of the latest refined products of a archaism."

The window sills of the western facade of the Erectheion are simple and plain, formed in cross section as rectangular sills and furnished with a groove and an opening, to make possible the placing of the closing slab, that was indeed perforated or of thin polished marble, as still to be seen on old Italian churches.(S. Miniato and Orvieto).

Very recently an American, S. P. Stevens, carefully examined the ashlars fallen before the western facade of the Erectheion, by which it was determined, that on the right and left of the main entrance doorway to the cell of Athena were arranged single narrow windows (opening 1 to 3 1/2), which had richly decorated architraves with caps. The sill, from which rose the jamb, was there plain and simple. The architrave, for which small space remained, must have been made of wood or metal, according to the finds. The arrangement recalls that of the entrance hall at the Pinacothek of the Propyleion at Athens. (Fig. 269).

d. The column consists of the base, shaft and capital, and it is not inclined toward the wall of the temple, as in the Doric order, but is set strictly vertical. It is diminished

Less than the Doric column, but a properly measurable entasis, rising to slender lines like the modern mustache, is a matter of 1 to 10 in the lower diameter. Lamentable admit, the lower diameter of the column is to the height as follows:—

| | |
|---|---|
| Temple of Ceres in Eleusis | 1 to 3 1/2. |
| Propylaion in Priene | 1 to 9 1/2. |
| Temple of Apollo in Miletus | 1 to 9 1/5. |
| Propylaion in Athens | 1 to 9 1/6. |
| Temple of Apollo in Phigaleia | 1 to 9 1/8. |
| Temple of Zeus in Aizani | 1 to 10. |

The median of the lot (exclusive of Aizani) is less than an equal to the lower radius of the column; the height of the Aizani capital (measured from above the volutes) is somewhat more than half radius; if a modified comparison by eliminations is arranged, as on the Protestation, then the weight of the capital measured from the top of the masses to the bottom of astragal is about 1/6 the lower diameter, or is about three-to, as on the Pheidia is Pelinaia.

Forty-four Doric of Antistrategos or real to Ionic, over-ran, generated from each other by merge filters, reversed the shape of the volume and terminate in Antistrategos Tom at its and bottom, passing into the propylaea.

Or the other accounts, the bare to height of a pilastry case Alpha of diagonal lens, Tigind horizontally or decorated by Antistrategos Antoctes, and ends fence Diroity on the ar-chitect stay of the stylobate and accounts a lower Ionic Tiryns. From edge a small square with right and square in-the the transition in the start of the column (see Lamb an Ictinus). Or auto Ionic are Lamb to left round or the ar-or last. Atom is not to be later as a monolithic in the acquiring. The base was nearly not fully arrived. To prepare Tyrins to the Dionne Pythia, wanted then the instrument un-all the modes consistent of the architecture, one it was then Pyramidal, mutated in view of Aesd, or even Intermediary. The lower side and to constantly remedy Pater matter, since it-quite away from Indicatory Tiryns to prove it architec-cover with Doric, with the later Aegina of the upper half' provided by eliminations. The Dance in the Valentinian pro-

less than the Doric column, has a scarcely measurable entasis, rising in slender form like its wooden prototype to a height of 8 to 10 times its lower diameter. Including plinth, the lower diameter of the column is to its height as follows:--

| | |
|---|---|
| Temple of Athena in Priene | 1 to 8 1/3. |
| Propyleion in Priene | 1 to 9 1/3. |
| Temple of Apollo in Miletus | 1 to 9 1/5. |
| Propyleion in Athens | 1 to 9 1/6. |
| Temple of Apollo in Phigaleia | 1 to 9 1/2. |
| Temple of Zeus in Aizani | 1 to 10. |

The height of the base (exclusive of plinth) is less than or equal to the lower radius of the column; the height of the simple capital (measured from above the volutes) is somewhat more than that radius; if a necking ornamented by anthemions is arranged, as on the Erectheion, then the height of the capital (measured from the top of the abacus to the bottom of astragal) is about 3/4 the lower diameter, or is equal thereto, as on the Temple in Phigaleia.

Twenty-four flutes of semicircular or oval horizontal section, separated from each other by narrow fillets, surround the shaft of the column and terminate in semicircular form at top and bottom, passing into the apophyges.

On the older monuments, the base consists of a slightly concave block of circular form, fluted horizontally or decorated by astragals and scotias, and which rests directly on the uppermost step of the stylobate and supports a torus likewise fluted, from which a small round with fillet and apophyge forms the transition to the shaft of the column (see Samos and Priene). On some temples the torus is left smooth on its upper half, which is not to be taken as a peculiarity in the moulding. The base was merely not fully wrought. To prevent injury to the delicate fillets, working them was postponed until the entire completion of the construction, and it was then frequently omitted in time of need, or even intentionally. The lower half must be completely wrought before setting, since it would have been technically impossible to reach it afterwards with tools, while the later working of the upper half presented no difficulties. The bases in the Hellenistic per-

period were frequently set on separate square blocks or plinths, as in Aphrodisias, Aizani, Teos and Priene, thus being removed from contact with the stylobate. The French excavations in Miletus have yielded polygonal plinths beneath the bases of the columns, decorated by reliefs.

The bases in the interior of the Temple at Phigaleia are of more expanded form with a strong apophyge, which does not permit the fixing of an early date. A beautifully perfected and refined form is only shown by those of the Attic monuments on the Acropolis at Athens. Without plinths, if the circular socle of the Ionic columns of the Propyleion in Athens be not so considered, they stand directly on the stylobate and are composed of a large torus, fillet, scotia, fillet, a smaller torus with fillet and an apophyge. The toruses are partly formed like a group of small astragals, are fluted like the columns, but here horizontally, or are covered by interwoven ornamentation.

From the simple and clear form, the bases of Hellenistic c columns accordingly vary. The members were no longer appropriately decorated, instead of beaded astragals and the horizontal flutes occur fret and scroll ornaments as well as ascending palm leaves and the like.(Figs. 270 a, b).

The square plinths with angles cut off in octagonal form a are to be regarded technically as an improvement. The angles were not loaded and were easily broken off from the low square plinth, carelessly set.

Shafts and bases of columns for this order were also roughly cut in the quarry, only being finished after setting, as shown by an unfinished drum of a column from the Didymaeon near Miletus.

The capital shows various starting points in its development and treatment. Two types continue beside each other, whose supporters are two principal Grecian races, the Aeolian and the Ionian. Larger works of the former are found in the Aeolic cities of Neandria and on Lesbos; of the latter in the Ionic Ephesus and Samos. The typical forms of capital for both races are the so-called volute capitals. The characteristic difference between them lies in the development and course of

ibiting a termination, as for the architrave of a rock-cut tomb in Limyra (Fig. 271). The most beautiful and finest motive for the terminal form of a horizontal projecting stone receiving a burden -- or a wooden beam. For the Aeolic capital, the volute derives from the spiral-like a scene of fitting, realizing to the capital of the Egyptian re-cutting [illegible] volume. [illegible] from full-bearing, period of Amenophis III. (1447 B.C.)).

[illegible] in Egypt found in Asiatic lands, among the Phoenicians, the Hittites, and in Cyprus (Fig. 272).

With reference to the role played by the "volute" in Greecian art on the Ionic capital, Perrot & Chipiez (I, p. 548) give ward, and in IV, 6, p. 846, a similar one from a bas-relief of Jezilli-Kale, taken from a Hittite [illegible] and [illegible] as Hittite work, of that people known in the Bible (Book of [illegible]). [illegible] the ancient civilizations of the Assyrians, [illegible] with and mixed the "[illegible]". The two forms of capital, consonant in their ground ideas, f [illegible] from the Hittite land [illegible] in the second half of the second century B.C., in the best period of [illegible] and of Pergamon. [illegible] two different countries at the same time, to which Hellas owes its art and civilization. (Figs. 272, 273, 274).

This ancient form only occurred again in the Peloponnesus on the half column in the interior of the Temple of Phigalia, that is indeed only correctly represented in the work of [illegible], [illegible] with the original [illegible] in the British Museum at London. See Fig. 275, on which it must be [illegible] Ionical-Tuscan in the Greek [illegible] architrave-[illegible], not that the upper figure is it [illegible] the conservative fine [illegible] of Cockerell is rarely [illegible] tectural.

[illegible] is already [illegible] Greek, that [illegible] capitals

the volutes. In the Ionic, an elongated dressed block is placed above the annular crowning echinus of the shaft, supporting the load of the entablature on the support, its ends exhibiting a termination, as for the architrave of a rock-cut Tomb in Limyra (Fig. 271). The most beautiful and finest motive for the terminal form of a horizontal projecting stone receiving a burden -- or a wooden beam. For the Aeolic capital, the volutes develop from the shaft like a crown of flowers, analagous to the capital of the Egyptian so-called lily column.(Fig. 272, from Tell-Amarna, period of Amenophis VI, (1447 B.C.)).

But the like form is further found on Assyrian tombs, among the Phoenicians, the Hittites, and on Cyprus.(Fig. 273).

With reference to the role played by the "volute" in Grecian art on the Ionic capital, Perrot & Chipiez (I, p. 548) give from the old kingdom of the Egyptians an entablature block with a column, whose capital shows two volutes curved downward, and in IV, 6, p. 645, a similar one from a bas-relief of Jasili-Kaïa, taken from a little structure and designated as Hittite work, of that people known in the Bible (Book of Joshua), and that were the western neighbors of the Assyrians, who became acquainted with and adopted the"column"from them. The two forms of capital, consonant in their ground ideas, f from Egypt and from the Hittite land became corrupted in the second half of the second century B.C., in the best period of the descendants of Thutmes and of Ramses. They thus occur in two different countries at the same time, to which Hellas owes its art and civilization.(Figs. 272, 273, 274).

This ancient form only occurred again in the Peleponnessus on the half columns in the interior of the Temple of Phigaleia, that is indeed only correctly represented in the work of Stackelberg, and which agrees with the original piece in the British Museum at London. See Fig. 275, on which it must be said, that besides the single fragment in the Museum mentioned nothing further exists, and that the abacus placed on it in the otherwise fine publication of Cockerell is merely conjectural.

But it should only be stated thereon, that those capitals

Ephesia in the time of Pericles (see my essay on this in Texts. Jahreshefte, 1909.) it presents only the sphinx and early archaic lions. In which is not merely due to chance because whereas the sphinx appears the lion-panther does not. Also the bases of the Erechtheion, that are designated by Kavvadias the Erech. This assimilation is likewise for no indication of great antiquity. It is avoided on the Ionic volutes of the Propylaion of Mnesikles on the Acropolis of Athens.

Definitely conserved in the representation as the cymae of the earliest Doric at Sunnyside and on Aegina (Fig. 275), on also on the Temple of Aphaia at Aegina (ibid. 276) and on the Doric of a pediment or capital or on the earliest representation in Corinth (Fig. 278). Here can arise no doubt concerning the duplex direction of the central and in the Greek of cymae, that one could do with the development of the regular lion's flower corolla growing out of the stem. The same is taught to us likewise by the capitals of the best end of the Alexandrine period, just as by the capitals with the best outer contours of the volutes from Boeri and Gela.(Fig. 277). Also from the archaic Ionic capital of the Acropolis Museum at Athens (Fig. 279) one can other figures of the development deduced.

The volutes, considered as a cylinder, were without to flower. But are in many cases derived in the middle and are joined by a palmette, as mentioned in the capitals of Delos and of Ionic Temple at Ilissus.(Fig. 279). In the Ionic capital of the Temple of Cybele at Sardis, the connection at the middle is again omitted, in its place being a rosette with encircling scholia.(Fig. 280). Instead of the echinus cap, there is shaped a cylindrical capital, some with plant band, and the middle frieze but can be covered by painted scales.(Original in Athens, Fig. 278). But there now occur further very remarkable diversities in the volutes

of half columns have no claim to high antiquity; for between them and the Egyptian or Hittite prototypes lie 1000 years, if not more. In am in nowise inclined to place the Temple of Phigaleia in the time of Pericles (see my Essay on this in Oestt. Jahresheften. 1906.); it repeats only the oldest and half unknown forms, in which is not carried out a clear separation between the echinus crowning the shaft and the intermediate block laid thereon.(Also see the bases of the antes on the Temple of Athena at Priene, that was dedicated by Alexander the Great). This unskilfulness is likewise for me no indication of great antiquity. It is avoided on the Ionic columns of the Propyleion of Mnesicles on the Acropolis of Athens.

Definitely expressed is the separation on the ruins of the ancient Temples at Naucratis and on Samos (Fig. 276), as also on the Column of Naxos at Delphi (Fig. 275) and on the capital of a column on Delos or on the ancient Artemesion in Ephesus. (Fig. 276). Here can arise no doubt concerning the duplex division of the capital and on the manner of origin, that has nothing to do with the development of the volutes from the f flower corolla growing out of the stem. The same is taught to us likewise by the capitals of the best end of the Alexandrine period, just as by the capitals with the bent outer co course of the volutes from Locri and Gela.(Fig. 277). Also from the archaic Ionic capital of the Acropolis Museum at Athens (Fig. 278) can no other course of the development be deduced.

The volutes, connected by a bolster, were without an abacus, but are in some cases divided in the middle and are joined by a palmation, as exhibited by the papitals of Delos and of Artemis Euclia at Athens.(Fig. 279). On the Alexandrine capital of the Temple of Cybele at Sardis, the connection at the middle is again omitted, in its place being a rosette with extending scholls.(Fig. 280). Instead of the echinus cap, there is placed on an antique capital a painted cyma with plain headband, and the vacant space between bolster and cap is covered by painted scales.(Original in Athens, Fig. 276). But there now occur further very remarkable diversities in the volutes

themselves. On the ancient Artemision at Ephesus (350 B.C.) are marked only the outer outlines of the columns, the overlapping vertical fluting being obtained by great remainders, as that there can be no question of a development of the volute mouldings. The same irregularity may also be seen on small ivory volutes derived from Iona, and also on the delicate metopes (Parthian volute capital) of the old Erechtheion. But in addition to the usual quartic curvature, there also occurs in the very Ionic capitals of the Apollo at Bassae (Pl. 30[7]), and the most common solution is seen with the various cups, which are either sockets or goblets, or then are filled with small inserted rosettes.

From the Mediterranean period therefore into the architecture of Inner Asia in the form of beads of bulla, that either grow o out alongside from the volutes or are placed in the middle between the spirals, as there or the example in Ephesus, Pergamon-Ai-Kiliseh, and Miletus (Pls. [illegible]). It is the place that centuries later inserted medallion-heads in place of the spirals (Pl. [illegible]). The bell-heads on the Doric capitals of the Propylaea Palace are interpreted therefore and already [illegible] block found on Cyprus (original in London) with winged bodies of bulls and interposed flowers and animal arrangement (Pl. [illegible]).

The Asiatic-Ionic form is usually designated as the oldest shape. Why is not stated; but it remains certain, that the purely Ionic measures that proved the models of the C in Dar-[illegible] interpreted at Ephesus, 350 B.C., and already represented on great monumental structures, while for the Asiatic not a single prototype can yet be established, unless in Calah-Nimrud, in Iona, and in Tomistra. As the original Ionic capital is related its capital in Persepolis-Ist Greek in Persepolis. There are two literature presented at the same time, of which the Ionic flowers and attached artistic half-rosettes, but the earlier [illegible] is still in a ground. Hence the [illegible] of course interpretations in the Persepolis period in Iran. Such styles have [illegible], that each is of an earlier age; the interesting experimental block with horizontal [illegible] and the rosettes between either with [illegible] or [illegible] volutes. The [illegible] of the divided volutes has likewise found proof there.

themselves. On the ancient Artemesion at Ephesus (560 B.C.) are marked only the outer outlines of the volutes, the surfaces thus enclosed being adorned by great rosettes, so that there can in general be no mention of a development of the volute outwards. The same treatment may also be seen on a small terra cotta capital from Gela, and also on the before mentioned Egyptian volute capital of the old kingdom. But in addition to the great rosette ornaments, there also occurs on the same Temple a course of the spirals about an end point. (Fig. 281). But the most common solution is that with the volute eyes, which are either smooth or hollowed, or they are filled with small inserted rosettes.

From the Hellenistic period likewise date the additions in inner Asia in the form of heads of bulls, that either grow o out sidewise from the bolster or are placed in the middle between the spirals, as shown by the examples in Ephesus, Magnesia-a-M. and Miletus.(Fig.282). At the place last mentioned are inserted medallion heads in place of the spirals.(Fig. 283). The bull heads on the Doric capitals of the Portico of the Bulls on Delos have an interesting analogy, formed by a block found on Cyprus (original in London) with winged bodies of bulls and interposed figure and scrool ornament.(Fig. 282).

The Aeolic-Ionic form is usually designated as the oldest shape. Why is not stated; but it remains certain, that the purely Ionic extended back beyond the middle of the 6 th century (old Artemesion at Ephesus, 560 B.C), and already appeared on great monumental structures, while for the Aeolic not a single peripteral use can be established, neither in Columdado, in Aegea, nor in Neandria. As the original for all may be regarded the capital in Boghas-koi drawn by Puchstein. "They are two flourishing branches of the same stem, of which the Aeolic bloomed and withered earliest." Well said, but the earlier blossoming is still to be proved. Among the fragments of porous limestone architecture in the Acropolis Museum in Athens, both styles have representatives, that must be of similar age, the interesting experimental block with horizontal projecting volutes and the rudely wrought pieces with painted or scratched ascending volutes.(Fig. 284). The arrangement of the divided volutes has likewise found proof there.

did not allow the Doric-Ionic to appear.

"Two flourishing branches" must be accepted; but only the Ionic came to blossom, as a result overweighted the stem and did not allow the Aeolic-Ionic to appear.

In Neandria Clarke and Koldewey labored successively on the Tschigi-Dagh. The latter succeeded in determining the form of the columns supporting the ridge of the roof, where were rows of leaves beneath the aspiring volutes, that accord with the similar forms on the columns of Persian royal palaces, but where it must not be forgotten, that the Persian hall structures mentioned date from the time of Darius and Xerxes (490 and 480 B.C.), the latter therefore being later and not being prototypes for the Grecian Ionic order.(Fig. 285).

The capital of the perfected Attic-ionic style exhibits in peripteral use the form, which we have seen on the Temple at Priene.(Fig. 284). The shaft of the column is enlarged as below at the base, so likewise above at the capital, and it usually finds its termination in a projecting round with a small fillet beneath (Fig. 288), frequently with a second above it. This astragal in most cases is wrought together with the shaft of the column or with the uppermost drum of the column,[1] and there first rises above this the bolster capital, wrought in a separate block, whose spirals sink toward the middle of the column, this sinking must personify the "springy action of t the curve." The bolster with the volutes rests on a great round, that is ornamented by carved or painted ovate leaves.

*Note 1. On a capital from the Temple of Artemis at Pergamon, the capital, astragal and a portion of the fluted shaft are wrought in one block.(Fig. 288).*

The bolster is covered by a rectangular moulded abacus with a raised central projection about 0.04 inch high to receive the architrave.(Fig. 287).

In later buildings the beautiful elastic line generally disappears, that connects together the two spirals, giving place to a straight and dry connection. The capitals of the pediment ends and the longer sides exhibit forms precisely similar. The surfaces of the volutes lie in the plane of the face of the architrave.

For a richer development of the capital, as on the Erectheion, there is added a special necking member, that is covered

the necking or the uppermost drum of the column.

apparent on the fragments of the temples in Baalbekis, on Ba-
bbert.(Fig. 288; original in the Naples Museum). While on t
the Erechtheion this is separated from the flutes of the shaft
of the column by an astragal, we find in the latter a contrac-
of the foliage lie in the spandrels of the arches terminating
the flutes.(Fig. 289).

that cannot be described by compasses. Their outlines are b
reproduction, Erechtheion), and their surfaces are correspondingly
or are joined with the spiral borders by delicate rounds.

The vacant triangular space, produced at the points where
the spirals separate from the depressed middle portion, is
usually concealed by a small palmette ornament, where this is
not the case, as on the magnificent capitals of the Erechthe-
ion, bronze nails in the outlines of the volutes indicate that
plate IV and Fig. 289).

The bolster at the side either retains its plain cut or bell
left, or hollows and astragals, smooth or set with beads, or-
nament it, following the curve of the outer spiral, or merely
the centre is marked with an ornament (see Wilkins), or the
surface of the bolster is covered by scrolls and palm orname-
nts (see Prices and Jones), or the bolster is composed of t
two acanthus cups united at the middle, from which reed-like
leaves extend to the outer spiral margin and border it like
lace, as may be seen on a single capital found on the Acropo-
lis of Athens.(Fig. 290).

by ascending anthemion ornament. To the quarter round is then also added a round adorned by plaited work, that is wrought on the capital, while the quarter round remains connected with the necking or the uppermost drum of the column.

But the anthemion on the necking of the capital is likewise apparent on the fragments of the temples in Naukratis, on Samos, and in very recent years on the columns of the Temple in Locri.(Fig. 286; original in the Naples Museum). While on t the Erecthion this is separated from the flutes of the shaft of the column by an astragal, we find in the latter a contraction between flutes and anthemions, since the downward points of the foliage lie in the spandrels of the arches terminating the flutes.(Fig. 286).

The spirals move in delicately curved lines in several coils that cannot be described by compasses. Their outlines are b bordered by an outwardly curved border, single or double (see Propyleion, Erecheion),and their surfaces are correspondingly hollowed out once or twice. In the richly shaped capitals, the turns of the volutes are separated by rectangular grooves or are joined with the spiral borders by delicate rounds.

The vacant triangular space,produced at the points where the spirals separate from the depressed middle portion, is usually concealed by a small palmette ornament, where this is not the case, as on the magnificent capitals of the Erechtheion, bronze nails in the outlines of the volutes indicate that gilded bronze palm leaves were inserted therein.(See colored Plate IV and Fig. 289).

The bolster at the side either retains its plain cut or bell shape, similarly enlarged from the centre toward right and left, or hollows and astragals, smooth or set with beads, ornament it, following the curve of the outer spiral, or merely the centre is masked with an ornament (see Miletus), or the surface of the bolster is covered by scrolls and palm ornaments (see Priene and Sardes), or the bolster is composed of t two acanthus cups united at the middle, from which reed-like leaves extend to the outer spiral margin and border it like lace, as may be seen on a single capital found on the Acropolis of Athens.(Fig. 290).

However perfected the Ionic capital must be termed, when ex-
[illegible]
trave, it was just as unsatisfactory at the angle of the per-
[illegible]
ment.

The external sides of the capital of the angle column paral-
lel to the faces of the architrave only half conform to those
of the intermediate normal columns. The volutes extending to-
ward the angle, designed to meet each other at a right angle,
are both bent at an angle of 45°, thus in a manner composing
a single volute. Thus the drawing and the development of the
normal volute are retained. The result must be designated as
thoughtful. The side helper thereby remains entirely normal
and requires no change. But it is otherwise with the sides
toward the wall and intersecting at right angles. No bending
occurs there nor a flexible junction as at the outer sides.
One volute says to the other:--"thus far and no farther!",
and both lose their unity, their logical development -- as
[illegible]
out into two parts by a vertical plane through the eye," these
abutting against each other in a rude way. Is this the sole
and earliest attempt? Certainly not. At the beginning we
perceive the Aeolio-Ionic style was probably never employed
[illegible]
the same law of development as those of the Attic-Ionic .
The earliest evidence of Attic-Ionic stone capitals of col-
[illegible]
and the columns of the ancient Artemision at Ephesus, which
in a striking manner show their origin from the wooden one,
[illegible]
bitrave, there lie over the free supports the narrow connect-
ing pieces of rectangular cross section, projecting far beyond
the support. "Basic analysis in the projection occurs in the on-
ly possible form of a spiral, when they with continual reduc-
tion of their thickness are firmly wound together or terminate
in the scheme of a volute; there a so-called eye marks the c
centre of the volute as an axis." Thus Karl Böttcher in his
Tektonik der Hellenen (Berlin. 1852. p. 228) -- inspired and
[illegible]
tene.

However perfected the Ionic capital must be termed, when employed between antes or in the line of direction of the architrave, it was just as unsatisfactory at the angle of the peripteral arrangement, where the two architraves are at a right angle.

The external sides of the capital of the angle column parallel to the faces of the architrave only half conform to those of the intermediate normal columns. The volutes extending toward the angle, designed to meet each other at a right angle, are both bent at an angle of 45°, thus in a manner composing a single volute. Thus the drawing and the development of the normal volute are retained. The result must be designated as thoughtful. The side bolster thereby remains entirely normal and requires no change. But it is otherwise with the sides toward the cell and intersecting at right angles. No bending occurs there nor a flexible junction as at the outer sides. One volute says to the other:--"thus far and no farther!", and both lose their unity, their logical development -- at least on the monuments of the best period. The volutes are cut into two parts by a vertical plane through the eye, these abutting against each other in a rude way. Is this the sole and earliest attempt? Certainly not. At the beginning we perceive the Aeolic-Ionic style was probably never employed as peripteral. Or if so, then must its angle columns obey t the same law of development as those of the Attic-Ionic .

The earliest evidence of Attic-Ionic stone capitals of columns remains to us in the votive column of Naxos at Delphi a and the columns of the ancient Artemesion at Ephesus, which in a striking manner show their origin from the wooden cap, preparatory for and making possible the reception of the architrave, there lie over the free supports the narrow connecting pieces of rectangular cross section, projecting far beyond the support. "Their ending in the projection occurs in the only possible form of a spiral, when they with continual reduction of their thickness are firmly wound together or terminate in the scheme of a volute; there a so-called eye marks the c centre of the volute as an axis." Thus Karl Bötticher in his Tektonik der Hellenen (Berdin. 1973. p. 293) -- inspired and true.

This widely projecting cap, that rests on a Doric-like cyma-
shows the so-called eye of the volute, not as in the best pe-
riod lying in the plane tangent to the shaft of the column,
but outside this. The further apart are the centres of the
eyes of the volutes, so much the more has the capital the ap-
pearance of a long extended form, that betrays the ground pr-
inciple of an innate wooden construction, which disappears b
the more, the nearer the centres of the eyes approach each o-
ther. On the Erechtheion, on the Little Temple on the Ilissus,
and on the little building of the wingless goddess of victory
(Nike Apteros), on Alexandrine temples etc., they are but lit-
tle outside this. On the position of the centres of these e
yes depends the formal treatment of the angle capital. This
tive age of the buildings.

of the capital of the Column of Naxos, or better of one of
the ancient Artemesion at Ephesus, we shall find that likewise
for the inner side is possible the full development of the wo-
lutes with the same outlines and with like courses of the vo-
lutes, as for the exterior. An analogy remains to us in some
small Ionic terra cotta columns, that once adorned the inter-
ior of a sarcophagus in Gela.(Fig. 297). I first saw and drew
one of these in London, a second in 1895 in the Arndt's Coll-
ection in Munich, and others were furnished to us by the pub-
lication of Paolo Orsi,[1] who had found an angle column in an
internal angle. Of the greatest value and interest for us,
since it supports our conception of the form of an angle cap-
ital with widely separated centres of the volutes.(Fig. 297).
The head right angle at which the volutes shut indeed remains,
but the volutes themselves remain undisturbed thereby. The
approximation of the centres of the eyes brought as a more

and the evasion in stone, in which the reminiscences of a
wooden construction disappeared, but when the combined volutes
must be taken in the bargain. But one would scarcely be trou-
bled thereby. The well known publications on the German exca-

This widely projecting cap, that rests on a Doric-like cymatium terminating the cyma and but partially covering this, shows the so-called eye of the volute, not as in the best period lying in the plane tangent to the shaft of the column, but outside this. The further apart are the centres of the eyes of the volutes, so much the more has the capital the appearance of a long extended form, that betrays the ground principle of an innate wooden construction, which disappears t the more, the nearer the centres of the eyes approach each other. On the Erechtheion, on the little Temple on the Ilissus, and on the little building of the wingless goddess of victory (Nike Apteros), on Alexandrine temples etc., they are but little outside this. On the position of the centres of these e eyes depends the formal treatment of the angle capital. This furthermore affords for us conclusions in regard to the relative age of the buildings.

If we attempt the drawing of an angle capital on the basis of the capital of the Column of Naxos, or better of one of the ancient Artemesion at Ephesus, we shall find that likewise for the inner side is possible the full development of the volutes with the same outlines and with like courses of the volutes, as for the exterior. An analogy remains to us in some small Ionic terra cotta columns, that once adorned the interior of a saccophagus in Gela.(Fig. 297). I first saw and drew one of these in London, a second in 1908 in the Arndt's Collection in Munich, and others were furnished to us by the publication of Paolo Orsi,[1] who had found an angle column in an internal angle. Of the greatest value and interest for us, since it supports our conception of the form of an angle capital with widely separated centres of the volutes.(Fig. 297). The hard right angle at which the volutes abut indeed remains, but the volutes themselves remain undisturbed thereby. The approximation of the centres of the eyes brought us a more finely proportioned general form, particularly the front side and the execution in stone, in which the reminiscences of a wooden construction disappeared, but when the combined volutes must be taken in the bargain. But one would scarcely be troubled thereby. The well known publications on the German exca-

excavations then also brought up this question, besides many others. In them with reference to the contributions and re-

(p. 94) it was determined, that for the form and decoration

one, one is referred to Chandler's view and two sketches of

angle varied, while the angle at which the two grooves at right angles intersected, in both cases was covered by a dal-mation springing from a corolla." The conclusion that the ab-utting volutes were "completely developed," is scarcely to

ion of what was said would indeed prove the untenability of

of the column.(Figs. 291 a, b). Thomas-Cubstein makes it 2.18 ft. from the centre of the column, Bayot only 1.88, Willi-berg-Swenson 1.98, while the photograph again makes it some-thing more. For this case it is important, who is right. H Here is only expressed the fact, that the centres of the vol-utes are near the shaft of the column, and that the outline of the volute passes over the same. This makes the "completely developed" volute on the inside already impossible.

Fig. 1. Hexamilia capitals. Left: Assyrian and Persian, Willi-am. 1908. Gelb. Sonst der 1900 - 1905. Fig. 338 (p. 528) by Solo Graf.

The capitals on the Erechtheion, on the two little Temples on the Ilissus and of Nike Apteros on the Acropolis of Athens, exhibit in the reentrant angle half eyes (Figs. 291 a and A) and half developed volutes. Men have since been satisfied w therewith. If Bayot's drawing and its interpretation by the editor of the German publication be accepted, then "complete" volutes would only be possible by proceeding according to Fig. 291 (m or n). In one case is obtained an about bolster, and in the other elliptical volutes, that appear to me equally im-possible. Both would be tasteless. On the contrary, if the greater, then would two entire eyes be possible, that touch

excavations then also brought up this question, besides many others. In them with reference to the contributions and reproductions of the sketches of the French investigator Huyot, (p. 94) it was determined, that for the form and decoration of the internal reentrant angle of the Ionic capital of Priene, one is referred to Chandler's view and two sketches of Huyot. These latter teach, "that the connected volutes were completely developed, and that the abacus on the reentrant a angle varied, while the angle at which the two grooves at right angles intersected, in both cases was covered by a palmation springing from a corolla." The conclusion that the abutting volutes were "completely developed," is scarcely to be taken in earnest. The attempt at a graphical representation of what was said would indeed prove the untenability of the principle. The centres of the volutes lie near the shaft of the column.(Figs. 291 a, b). Thomas-Puchstein makes it 2.13 ft. from the centre of the column, Huyot only 1.86, Willberg-Swenson 1.96, while the photograph again makes it something more. For this case it is important, who is right. H Here is only expressed the fact, that the centres of the volutes are near the shaft of the column, and that the outline of the volute passes over the same. This makes the "completely developed" volute on the inside already impossible.

*Note 1. Monumenti antichi. Real Accademia dei Lincei. Milan. 1906. Gela, Scavi del 1900 - 1905. Fig. 366 (p. 523) by Paolo Orsi.*

The capitals on the Erechtheion, on the two little Temples on the Ilissus and of Nike Apteros on the Acropolis of Athens, exhibit in the reentrant angle half eyes (Figs. 291 a and A) and half developed volutes. Men have since been satisfied w therewith. If Huyot's drawing and its interpretation by the editor of the German publication be accepted, then "complete" volutes would only be possible by proceeding according to Fig. 291 (m or n). In one case is obtained an uncut bolster, and in the other elleptical volutes, that appear to me equally impossible. Both would be tasteless. On the contrary, if the distance between the centres of the volutes was taken somewhat greater, then would two entire eyes be possible, that touch

at one point and would justify the growth of a palmatium between them.(Fig. 291 a). But if one adopts the dimensions of Thomas-Puchstein as sufficient, then the second turns of the volutes touch; the innermost turns and the eyes remain normal, and Huyot's palmatiums would probably be arranged. They would be organically developed from the turns of the volutes, and in their general proportions -- at least for my taste -- would appear well arranged. Their plain reproduction after the sketches of Huyot tells us nothing more, whether we have to do w with a more possible way for this or merely with a suggestion.

W. Lethaby in his "Greek Buildings"(II. Tomb of Maosolus. p. 59, 60. London. 1908). is occupied with the question, whereby according to his Fig. 46, the completeness of the volute on the inner side is abandoned, -- at least for Halicarnassus, -- where the second turns touch each other, but the eyes remain intact.

A. Marquand (Greek Architecture. New York. 1909). embodies Huyot's statements in his Fig. 314 with entire volutes and inserted palmatiums in their absolute impossibility.

It is yet to be stated, that the abutting angle volutes were generally richly decorated at the intersection; with foliage on the Erechtheion, with palmatiums in Priene, a fragment of which is preserved in the Pergamon Museum in Berlin.

What makes the Doric capital so convenient for peripteral use -- the uniform and easy possibility of placing it on any location, without being compelled to change its form-- fails in that developed from the Ionic. Even the Hellenic genius, skilled in form, could create no satisfying result in the treatment of the separate angle capital.

It is still to be noted, that the angle palmatiums of the volutes are not always placed in the triangular space above the cymatium, but frequently fall down on the cymatium.(See the capitals from the ancient and the Alexandrine Artemesion at Ephesus, once with more severe, than with more animated treatment.(Fig. 294).

A rather foreign treatment is shown by the Ionic capitals from Soluntum in the Museum at Palermo, on which instead of the angle palm leaves, tall upright anthemions are arranged

as if intersecting over the bolster. (Fig. 397).

A more convenient peripteral use led to Ionic capitals with volutes on four sides, examples of which are given by Fig. 398. We find them common in Pompeii with polychromatic finish and with the characteristic egg-and-dart on the low cyma, as if in thin metal. The volutes are then colored light blue on the front surfaces and yellow on the rear side.[1]

Note 8. [illegible] Fragments architectoniques et ornements et ornementaies sur l'Antique et sur la Frasie, Pl. 10. Palermo. 1864.

If the Ionic capital was already characterized by its form and decoration, it still only attained the highest degree of its ornamentation by painting. (See colored Plate IV.).

Various of this [illegible] are on the Athenian fragments.[2]

Note 9. Compare the corresponding statements concerning painting in Alig. Baur. 1881. p. 390.

[illegible] lines, red volute eyes, cymas with red and green leaves, red-dish yellow spiral lines on another, bands and palmettes [illegible] on a red coating, the eyes green and the leaves alternately red and green.

As peculiarities may be still be mentioned:--

[illegible] ionic form, whose origin thus lies somewhat further back; [illegible] portion of an angle capital of the best period, wandered from the path. The piece was found in Wilatus, an allied one from Cyus and from the 4 th century B.C. is found in the Berlin [illegible].

On a capital from Priene are exserted unequal volute burns, four on the left and three burns of the spirals on the right. (Fig. 399). Then on the Ionic Temple on the theatre terrace at Pergamon (215 A. D.; original in Berlin Museum), the Eroco-co projecting burns of the volutes, like shavings from a plane, not produced better by the Italian and German late Renaissance. (Fig. 399).

as if intersecting over the bolster. (Fig. 295).

A more convenient peripteral use led to Ionic capitals with volutes on four sides, examples of which are given by Fig. 295. We find them common in Pompeii with polychromatic finish and with the characteristic eggs-and-darts on the low cyma, as if in thin metal. The volutes are then colored light blue on the front surfaces and yellow on the rear side.[1]

*Note 1. See Damiani-Almeyda, G. Institutions Architectoniques et ornamentales sur l'Antique et sur la Vraie. Pl. 10. Palermo. 1884.*

If the Ionic capital was already characterized by its form and decoration, it still only attained the highest degree of its ornamentation by painting. (See colored Plate IV.).

Vestiges of this have frequently been preserved for us on the Athenian fragments.[2]

*Note 2. Compare the corresponding statements concerning p painting in Allg. Bauz. 1881. p. 350.*

On ancient Athenian stele capitals are visible green spiral lines, red volute eyes, cymas with red and green leaves, reddish yellow spiral lines on another, bands and palmations colored red and white, on a third being the fret on the abacus green on a red coating, the eyes green and the leaves alternately red and green.

As peculiarities may be still be mentioned:--

The mode of connection of four volutes at the angles in archaic forms, whose origin thus lies somewhat further back, and by which it is shown how men, without the exertion of the distortion of an angle capital of the best period, wandered from the path. The piece was found in Miletus, an allied one from Myus and from the 4 th century B.C. is found in the Berlin Museum.(Fig. 296; altar acroteria).

On a capital from Priene are executed unequal volute turns, four on the left and three turns of the spirals on the right. (Fig. 298). Then on the Ionic Temple on the theatre terrace at Pergamon (215 A. D.; original in Berlin Museum), the Barocco projecting turns of the volutes, like shavings from a plane, not produced better by the Italian and German late Renaissance. (Fig. 299).

As not exactly happy and even ugly was the capitals from the Temenion at Pergamon with the decorated pieces above the abacus (original in Berlin), and likewise the elongated side volutes on the pieces of the alter abmoduns itself, ending in the form of half columns, while again a double capital from Dimemmai (original in the Louvre, Paris) exhibits a pretty solution in the connection of the two volutes.(Fig. 200).

As a splendid variety of the Ionic order course the "corinthian capitals". In which the shaft of the column was adorned by sculptures -- one of the most splendid forms of this style. This motive was already found on the ancient Artemesion at Ephesus, the only temple spared by Xerxes, and that was still standing at the birth of Alexander the Great. From a heavy torus rose the skinny fluted shaft of the column, whose lower third was covered by standing figures in relief, and it was crowned at top by the strongly projecting volute capital shown.(Fig. 201). The erotic figures indicate Assyrian prototypes.

A reinterpretion of this ancient Greeks on the basis of the native food was attempted by David George Hogarth. M.A.(The Ionian Artemisia [illegible] at Ephesus). With the scarcity of the materials, this is problematical as for many other temples.

[illegible]

[illegible] was 9.71 ft. between external angles, the diameter of the column is about 5.94 ft., the flat frieze were adorned by small [illegible] ible to see. Flat Caincerebes made of it after the fire is shown by the remains discovered by Wood (now Dimmino collection [illegible] Andrione master has added thereto the cubical pedestals on the pediment facade, also decorated by figures, between which formerly lay the antenne steps. In any case a magnificent frieze of the first rank, such as antiquity can scarcely again exhibit! The parts and their sequence were indeed retained, [illegible] made of bronz?

As not exactly happy and even ugly are the capitals from the the Gymnasium at Pergamon with the decorated pieces above the abacus (original in Berlin), and likewise the elongated side bolster on the pieces of the altar structure itself, ending in the form of half columns, while again a double capital from Clazomenai (original in the Louvre, Paris) exhibits a pretty solution in the connection of the two bolsters.(Fig. 300).

As a splendid variety of the Ionic order occurs the "columna caelata", in which the shaft of the column was adorned by sculptures -- one of the most splended forms of this style. This motive was already found on the ancient Artemesion at E Ephesus, the only temple spared by Xerxes, and that was still standing at the birth of Alexander the Great. From a heavy torus rose the stumpy fluted shaft of the column, whose lower third was covered by standing figures in relief, and it was crowned at top by the strongly projecting volute capital shown.(Fig. 301). The archaic figures indicate Assyrian prototypes.

A restoration of this ancient Temple on the basis of the remains found was attempted by David George Hogarth. M.A.(The Archaic Artemisia. London. 1908. British Museum Excavations at Ephesus). With the scarcity of the materials, this is pr problematical as for many other temples.

Bases, pedestal figures, capitals and cyma fragments are exhibited in the British Museum at London. The capitals measure 9.51 ft. between external angles, the diameter of the columns is about 3.94 ft., the flat faced cyma adorned by small figures and lions' heads is 2.95 ft. high. So much was accessible to me. What Deinocrates made of it after the fire is shown by the remains discovered by Wood (now likewise collected and exhibited in the British Museum at London). The Alexandrine master has added thereto the cubical pedestals on the pediment facade, also decorated by figures, between which formerly lay the entrance steps. In any case a magnificent facade of the first rank, such as antiquity can scarcely again exhibit! The parts and their sequence were indeed retained, but what has the Alexandrine artist with his eminent abilities made of them?

Fig. 201 shows the sculptured decoration with the signature of Vibe Dreaeus, beside the Alexandrine (Fig. 203). And Fig. 204 gives the pedestal with the base of the column thereon. Fig. 202 is determinative for the capital of the new temple, elegant and graceful in comparison with that of the ancient sanctuary.

Likewise indeed from the Alexandrine or a somewhat earlier period dates the marble throne support (Fig. 206), now exhibited in the Palermo museum, which repeats the beautiful motive of figures clasped around the stem of the support.

[illegible]

the Theatre at Laodicea (Ollettenti, Chap. 7, Pl. 50, German edition), of the time between Vespasian and Trajan, about 90 A.D., and two capitals of columns in the constituents of the Ionic Temple at Aizani, that according to recent antiquarian studies must belong to the classistic directed period of Hadrian -- thus after 117 A.D. But it is not impossible for the inscription to be later than the work. What would speak more decidedly for a later date is the fact, that two capitals from Aizani [1] recall the Roman Composite capital, which is first found in 70 A.D. on the Arch of Titus in Rome. Accordingly the capital in Laodicea is still unexplain.

Note 1. In the pronaos.

Then is further the subdivision of the cell walls and the accenting of the end and bed joints, which cannot be proved for the Greeian temple.

For the cell walls of Ionic temples of the best period were also mentioned the antes and their triple subdivision in general. Things may be further added in details:--

The antes and wall piers corresponding to the columns have a form of capital different from that of the columns, as in the Doric order. Their volute motive is not transferred to the latter, for it would have been senseless. Egg-and-dart moulding, beam leaves, beads and discs, richly ornamented cymas and astragals compose a beautifully developed crowning of the antes, that rise vertically without diminution and rest below on a base panelled similarly to those of the columns. -- Interesting are the angle solutions of the leaf adorned cyma bands, both on the antes as well as on the volute capitals.

Fig. 301 shows the sculptured decoration with the signature of king Croesus, beside the Alexandrine.(Fig. 303). And Fig. 304 gives the pedestal with the base of the column thereon. Fig. 302 is determinative for the capital of the new temple, elegant and graceful in coparison with that of the ancient sanctuary.

Likewise indeed from the Alexandrine or a somewhat earlier period dates the marble throne support (Fig. 209), now exhibited in the Palermo Museum, which repeats the beautiful motive of figures placed around the stem of the support.

Under Roman influence indeed is the Ionic capital form from the Theatre at Laodicea (Dilettanti, Chap. 7, Pl. 50, German edition), of the time between Vespasian and Trajan, about 90 A.D., and two capitals of columns in the oposthodome of the Ionic Temple at Aizani, that according to recent epigraphic studies must belong to the classistic directed period of Hadrian -- thus after 117 A.D. But it is not impossible for t the inscription to be later than the work. What would speak more urgently for a later date is the fact, that two capitals from Aizani [1] recall the Roman Coposite capital, which is first found in 70 A.D. on the Arch of Titus in Rome. Accordingly the capital in Laodicea is still uncertain.

*Note 1. In the pronaos.*

Then is further the subdivision of the cell walls and the accenting of the end and bed joints, which cannot be proved for the Grecian temple.

For the cell walls of Ionic temples of the best period were also mentioned the antes and their triple subdivision in general. There may be further added in details:--

The antes and wall piers corresponding to the columns have a form of capital different from that of the columns, as in the Doric order. Their volute motive is not transferred to the latter, for it would have been senseless. Egg-and-dart moulding, heart leaves, beads and disks, richly ornamented c cymas and astragals compose a beautifully developed crowning of the antes, that rise vertically without diminution and rest below on a base paneled similarly to those of the columns. -- Interesting are the angle solutions of the leaf adorned myma bands, both on the antes as well as on the volute capitals.

[illegible] ly arranged is also the foliage at the pediment angle of the [illegible] general was not disturbed!

[illegible] Alexandrine-Ionic architecture in Asia Minor:

[illegible] subsoil. They are discovered at the Propylaia of the Sanctuary [illegible] Hall in Magnesia-a-M (see the official Berlin publication [illegible] same). While here band-like divisions of the walls are provided in the Western Hall of the Agora, neither square piers nor [illegible] [illegible] accordance with the reproduction in the Dilettanti.

What care in execution was employed on the least detail is shown by this leaf ornament. Frequently concealed and employed at a considrable height on the building, still the details are executed with the same love and like care, as if they were placed just before the eyes of the observer; nowhere appears haste in the modeling. With fine feeling and graduated in relief are the different parts of the leaves, and just as unusually beautiful are the tenderly recurved outilnes of the ovate and lanceolate leaves; just as thoughtful and beautifully arranged is also the foliage at the reentrant angle of the abacus on the angle volute capital.(Figs. 293, 305). And with all this minute execution and surpassing development of the smallest details, the care for the effect of the entirety in general was not disturbed!

These simple and finely graduated ornaments of the early period gave place to a heavy ornamentation on the buildings of Alexander the Great, that is not even symmetrically arranged, and exhibits fillets on one side and scroll ornaments on the other, which have nothing to do with each other organically, (Fig. 307) -- but the former remains characteristic for the Alexandrine-Ionic architecture in Asia Minor.

Besides the columns there also occur square piers as free supports. They are determined at the Propyleion of the Eastern Hall in Magnesia-a-M (see the official Berlin publication. 1904, p. 129), as singly detached and as coupled supports with four developed faces of the capitals.(Fig. 123 in the same). While here band-like divisions of the walls are proved in the Western Hall of the Agora, neither square piers nor wall bands could be determined in Priene by the German investigators (1904), even if they were difinitely given in the works of the Dilettanti.(1829). Even the plan of the Propyleion with 2 × 3 = 6 square piers was gone, thus the editor of the work mentioned being reproached, because in the year 1829 he did not regard everything, that was first made known to a wider circle in 1904.

The capital of a wall pilaster from Miletus (Figs. 308 a, b) on the contrary received grace, since it actually existed in accordance with the reproduction in the Dilettanti.

[illegible] were made [illegible] Europe and [illegible]. [illegible] Dorchester [illegible] Museum [illegible] Fitzwilliam Museum [illegible] Ashmolean [illegible] Lost Treasures of Britain [illegible] in Berlin and London.(Fig. 309).

Among the [illegible] of marble in the private Tem-
ple is prominent an ante capital of extremely artistic execu-
tion, that exhibits differently ornamented bands in triple
sequence. The middle one of these shows alternating lotus
flowers and [illegible] palmettes; [illegible] the surfaces are wrought as perforated by the lotus calyxes.
(Fig. 310). Labeled as found in the Temple Kaminaki.

No. 1227. Capital of Pilaster.(4 th century B.C.). The
[illegible] at Ephesus.(?). Temples of [illegible] lot-
ed lot, then lotus and palmettes [illegible] [illegible]-
ing. Ephesus. (Evidently incorrectly copied).

[illegible] as a conclusion [illegible] [illegible] same) two Corinthian pier capitals in the immediate vicinity
of the [illegible] [illegible] [illegible] is highly probable from the place where found; where they
were placed is scarcely now to be determined." Thus the ar-
[illegible]

A third kind of detached support is the human figures sup-
porting [illegible] with them attached to the wall of the cell of the mighties
Doric monument, the Temple of Zeus in Akragas; as gigantic st-
[illegible] or telamones, they supported with arms thrown back the
entablature of the middle aisle. Detached from the space-en-
closing walls and [illegible] [illegible] [illegible] of a dream-
ful portico, we again meet with them as isolated maidens in
the Ionic style of architecture.

These maidens [illegible] extremely
[illegible] without especial animation in expression, a
[illegible] [illegible] [illegible] [illegible]
close to the body, with carefully plaited hair and hanging p

Similar capitals with such delicate scrolls and tenderly developed bolsters, that were found in Priene and Magnesia-a.M, are stele capitals (Fig. 309), and they formerly bore on their upper surfaces the foot marks of bronze figures; accordingly they may have served as tall supports of consecrated gifts.

Allied to these are the capitals designated as the ends of the backs of benches in horseshoe form, whose originals are in Berlin and London.(Fig. 309).

Among the Ephesian fragments of marble in the British Museum is prominent an ante capital of extremely artistic execution, that exhibits differently ornamented bands in triple sequence. The middle one of these shows alternating lotus flowers and recurved palmations growing from scrolls, where the surfaces are wrought as perforated by the lotus calyxes. (Fig. 310). Labeled as follows in the Museum mentioned.

No. 1287. Capital of Pilaster.(4 th century B.C.). The moulding subsequently get down.(?). Remains of egg-moulding at top, then lotus and palmettes leaf and art and bead moulding. Ephesus. (Evidently incorrectly copied).

But as a consolation were yet found in Priene (p. 132 of same) two Corinthian pier capitals in the immediate vicinity of the Propyleion:-- "that these belonged to the Propyleion is highly probable from the place where found; where they were placed is scarcely now to be determined." Thus the architects of the Dilettanti must still have had a glimmering.

A third kind of detached support is the human figures supporting an architrave. We have already become acquainted with them attached to the wall of the cell of the mightiest Doric monument, the Temple of Zeus in Akragas; as gigantic atlantes or telamones, they supported with arms thrown back the entablature of the middle aisle. Detached from the space-enclosing walls and bearing the architrave and cornice of a graceful portico, we again meet with them as isolated maidens in the Ionic style of architecture.

These maidens (called caryatids) stand quietly and strongly on square plinths without especial animation in expression a and attitude, the resting leg bent but slightly, the arms held close to the body, with carefully plaited hair and hanging p

plaited tresses, a cushion on the head, from which rises a cap imitated from the Doric capital.

Four such figures stand along the front of the caryatid portico at Athens in pairs similar in attitude and movement, symmetrically arranged about the axis of the building, the supporting leg on the outside with the folds of the coverings falling straight down, the leg at rest being on the side next the middle of the structure. (Fig. 311).

If the figures are actually supports, then in accordance with the thinner and more elegant supports (they break easily at the weaker necking, as shown by the figures on the Erechtheion), the entablature is made lighter. Hence for example, the frieze is wanting on the building mentioned; instead of it, the upper band of the architrave is ornamented by rosettes in order to produce a richer effect or to compensate in some degree for the impoverishment of the entablature, due to the omission of the frieze. The internal supporting beams elsewhere corresponding to the frieze are omitted; the room is ceiled in the simplest manner by slabs with coffers. Dieulafoy recognizes in the arrangement of the entablature the direct transference of the ancient Persian terraced roof cornice into stone.

These perfectly beautiful female figures of the best period are preceded by others, serving for the same purpose on the Treasury of the Cnidians at Delphi, -- archaic in expression and pose.(Figs. 312, 313). Instead of the compressed Doric head cushions employed at the Pandroseion, the figures stand on separate pedestals and bear a tolerably high cylinder adorned by reliefs and with a border of leaves, on which rests the load of the entablature, and that of the pediment.

The motive seems to have been a favorite one, to conclude from its use in vase painting.

In hall 19 (No. 1477, Lucania-Anzi-Pesto) of the Naples Museum is represented on a vase with black ground with red figures, a propyleion (?) about 8 ins. high, that exhibits white caryatids on pedestals demorated by foliage, that support an entablature with pediment. (Fig. 318)

With great sculptural charm are the three dancing women fo

must have once supported a metal tripod. On the whole a show piece 32.8 ft. high! (Fig. 314).

At the Heraeum in Samos-Ancient-Samos (Olympeion) [illegible] Doric colonnade, as well as Doric and Ionic [illegible] the plan monuments of the [illegible] (Mitt. VA, VB, VC, VD, 78 of the German publication. Berlin. 1904.

From the colonnade [illegible] in two or three [illegible] consisting of architraves, friezes and main cornices. The [illegible] arrangement of a frieze in [illegible] tradition of the Ionic [illegible] Fig. 315 and 316 shows [illegible] for [illegible] a [illegible] [illegible] architecture, [illegible] have influenced the Ionic [illegible] tion of the entablature. The same elements reappear in both modes of construction, yet the frieze is wanting in the wood-ceiling is retained in the stone construction. A stone capital of the wooden form shown was found in Delos, a form that Dinsen earlier termed an impossibility.(p. 270. Paris. 1876).

Very recently George Kawerau (Athen-Mitth. 1906) has again [illegible] projecting volutes from the wooden architectural style, on [illegible] um at Athens.

[illegible] Instead of the beams with the suspended rosettes and drops, they receive a continuous crowning moulding, often richly ornamented; its vertical surface is divided into two or three fascias and is generally subdivided alike, both internally and externally. The separate fascias may have once possessed [illegible] On the smaller monuments, they are cut from a single block of stone in width; in temples of important dimensions, where the diameters of the columns are increased to 8.56 ft. or more, they are made of two stone beams in width, as for example in Kassiopia.

found in Delphi, that stood on a high base like a candelabrum, and according to the suppositions of the French archaeologists, must have once supported a metal tripod. On the whole a show piece 32.8 ft. high! (Fig. 314).

At the Artemesion in Magnesia-a-M are mentioned enclosures between the Ionic columns, as well as cornice and frieze of the side enclosures of the opisthodome.(Figs. 74, 75, 76, 77, 78 of the German publication. Berlin. 1904.

From the columns rose the entablature in two or three divisions, consisting of architrave, frieze and main cornice. The former existence of a frieze on some temples of the Ionic order is further doubted without compulsory reason. Figs. 315 and 316 exhibit for comparison a possible preceding wooden architecture, that may have influenced the later stone construction of the entablature. The same elements reappear in both modes of construction, yet the frieze is wanting in the wooden arrangement, but on the contrary the height of the portico ceiling is retained in the stone construction. A stone capital of the wooden form shown was found in Delos, a form that Chipiez earlier termed an impossibility.(p. 270. Paris. 1876).

Very recently George Kawerau (Athen-Mitth. 1908) has again advocated the desivation of the stone capital with horizontal projecting volutes from the wooden architectural style, on the ground of some fragments exhibited in the Acropolis Museum at Athens.

The architraves are indeed bold in regard to the slender columns, but are yet lighter than those of the Doric order; Instead of the taenia with the suspended regulas and drops, they receive a continuous crowning moulding, often richly ornamented; its vertical surface is divided into two or three fascias and is generally subdivided alike, both internally and externally. The separate fascias may have once possesed painted ornaments, but vestiges of these are no longer visible. On the smaller monuments, they are cut from a single block of stone in width; in temples of important dimensions, where the diameters of the columns are increased to 6.56 ft. or more, they are made of two stone beams in width, as for example in Magnesia.

Remains in Priene show the inner vertical surface of the architrave less in depth than the outer one, and the under surface is decorated by a sunken panel, bordered by a pearl bead and heart leaves. (Fig. 317).

The height of the architrave is usually equal to the upper diameter of the column; it is frequently higher on the earlier temples and also somewhat lower on the later ones. Thus for example, the architrave is higher on the little Temple of Nike Apteros, is equal on the Erechtheion, and is lower on the Temples in Priene and Miletus, than the upper diameter of the column.

As shown for Doric monuments, the contact of the bearing surfaces is only on narrow cut borders. The architrave, cut from a single block, joins at considerably less than 45° for a space inside, then continues at right angles to the exterior. They still have in this order the purpose of bearing the portico ceiling, that rests directly on them, which may again denote a preceding wooden construction.

f. The Frieze (zoophoros, figure bearer, thrinkos, etc.) is required by Vitruvius to be about a quarter less than the architrave, "but if reliefs are to be executed thereon, about a quarter higher, so that the sculptures may be more prominent." For the plain and moreover not established friezes of the buildings in Priene given by the Dilettanti, the rule of Vitruvius approximately agrees; the friezes are there 1/4 and 2/5 lower than the architrave. But the friezes of the little Temple of Nike Apteros and of the Erechtheion are adorned by figures and are likewise lower than the corresponding architraves, indeed about 1/12; therefore the rule does not fit them.

The small figures of the frieze are either carved on the slab, thus being of the same piece with it, or they are wrought separately and attached, as on the Erechtheion, while the frieze slabs are of darker Eleusinian marble, and the figures are made of Parian marble, and were fixed by iron pins.

The effect was further heightened by color. There is naturally no mention of the influence of the frieze on the spacing of the columns in its development.

The frieze, as an implicit and structurally indispensable portion of the Ionic entablature, is neither in wooden nor in stone construction especially required for the reception of weak and closely set ceiling beams.

At the ancient Artemesion at Ephesus, S. Hogarth (London, 1908) properly assumes in his work thereon a triply divided architrave over the stumpy columns, adds a round and places on this the cornice with the crowning cyma. Likewise the tomb facades in Antiphellos and other places exhibit no friezes. (Fig. 261).

A. Choisy (Histoire de l'Architecture. I. Paris) is therefore right, when he says that frieze and dentils are voluntary additions; the only material difference being the presence or absence of one or the other on the Ionic cornice. From the house onwards the frieze is intended to bear figures, and the plain frieze predominates only in the epoch of Priene-Miletus. Dentils chiefly occur in Athens only on the Pandroseion, but are almost always found in Asia. On the archaic Ionic Treasury of the Cnidians at Delphi(second half of the 6 th century B.C.), the complete severely arranged figure frieze exists between architrave and crowning cornice, and it is now exhibited in the Museum at Delphi. Likewise is ensured by actual existence on the Erechtheion on the Acropolis of Athens the frieze bearing sculptures, that on account of the reasons already given was omitted on the caryatid portico of the building mentioned, for which the dentils are then taken.

The Dilettanti published (1829) in their work the ground plans and elevations of the Ionic Temple of Athena Polias at Priene, giving a plain frieze to it. But objections to this were not made until a few years since (1904). The date of the erection of the Temple is fixed by a dedicatory inscription of Alexander the Great.(Between 336 and 323 B.C.). Thus about 80 years later than the completion of the Erechtheion. Nevertheless the Ionic Temple mentioned is preferably taken as the starting point of the Ionic style of architecture in western Asia, and also of the Artemesion at Magnesia-a-M, about 100 years later, it is quietly printed, "that it was of wide importance for the development of Hellenistic architecture."

The Hellenistic Artemesion at Ephesus, that was completed by one of the generals of Alexander, even before one thought of the transformation of the Artemesion in Magnesia, did it indeed play no part?

Yet two Ionic monuments of the time from 370 to 350 B.C. must be included here, the so-called Nereid Monument at Xanthos in Lycia and the Tomb of Mausolus at Halicarnassos. At the former we have to do with an "architrave" 1.64 ft. high decorated by figures and resting directly on the Ionic columns -- not a frieze -- with a lower fillet and upper crowning egg-and-dart moulding, over which is the dentil band with the undercut cornice slab, thus with an entablature divided into but two parts. Against the mode of exhibiting the marble remains in the British Museum in London by Falkener and Fellows, no objections have been made, according to my recollection. (See the small Guides to the British Museum; the Nereid Monument and the Mausoleum and sculptures of Halicarnassos and of Priene. London. 1900). On the contrary, the mode of erecting the remains of the Mausoleum at Halicarnassos in the British Museum in London is not everywhere accepted. The arrangement of the figure frieze above the architrave supported by the columns is doubted.(Fig. 316). I may not criticize its location, for the frieze cannot here be omitted with reference to the remaining architecture. In the German publication on Priene, it is stated concerning the frieze of the Temple of Athena Polias, "that no piece was to be found on the site, which must necessarily have come from the frieze," and hence the remarkable conclusion was deduced; "and in fact the Temple never possessed a frieze, but directly on the architrave crowned by a cyma with ovate forms lay the boldly projecting dentils, after the analogy of the entablature on the Leonidaion in Olympia (4 th century B.C.), and on the peripteral portico of the Altar of Zeus at Pergamon." This proof is not exactly absolute. The proposed limitation of the entablature in Priene to architrave and corona of the corresponding structure appears to me personally from a purely artistic point of view too heavy and on the whole inharmonious with the not very slender proportions of the columns, and to the high bases still

set on square plinths. The long line above the columns is t thin and dry, loads and supports are not intended for each other. By the laying up of the original blocks of the entablature in the Pergamon Museum [1] at Berlin, the finely membered corona with the dentils appears too directly placed on the stumpy and triply subdivided architrave.

*Note 1. The Pergamon Museum in Berlin has meanwhile disappeared as a building, after it had done good service for seven years.*

The Alexandrine artists still understood how to derive a sound application from the traditional, and should it be denied here? Place then the two facades beside each other, that as given by the Dilettanti and the German solution, and I ask to which of them belongs the prize?

The Artemesion at Magnesia-a-M, built by Hermogenes and dedicated in 206 B.C., and the slightly older Temple of Zeus, b both had friezes. A plain frieze is also proved for the Propyleion, and one decorated by ox-skulls and garlands on the great altar of burnt offering there. And how beautiful in e effect in the former Pergamon Museum in Berlin was the logically restored great entablature block (see the official publication on Magnesia-a-M., Pl. 5. Berlin. 1904) with the bold architrave, the graceful frieze adorned by little figures and the splendid main cornice! Must one in Priene have abandoned the traditional grounds, that Hermogenes in Magnesia had not lost? As so without taste, I do not now hold the ancient masters of Priene. And secular structures in Olympia can scarcely be alleged as analogies, when it concerns the work of grand art. The architect of the owner of the inn in Olympia could allow much, that the temple architecture in Priene was not p permitted.

I reverse the saying "Quod licet bovi, non licet Jovi!" (What is permitted to the ox is not permitted to Jupiter). Y Yet this also is a matter of taste!

A frieze with dancing female figures (now in the Louvre) is likewise assured on the ancient Temple in Samothrace, whose cornice bore dentils, likewise on the Philippeon at Olympia. This building also did not lack the frieze.

A frieze decorated b, pines (vertical bolloved leaves) pem-
ains on the Ionic Temple in Aizanai, that bears above the den-
tils a cornice band, and now was corrected in the time of Ha-
drian, as stated.

6. The crowning cornice on most Attic monuments consists
of a bold and moderately projecting inclined slab crowned by
an ogee with pearl band, which passes into the surface of the
frieze.(Fig. 318 d).

The front surface of the cornice is usually inclined some-
what outwards, so that the lowest point lies nearer the plane
of the frieze than the upper one, an arrangement likewise
found in the covering bands of the small Ionic members, as
for example, on the abacus of the column and ante capitals a
and on the front surface of the cornice slab.

members above capitals of columns, especially the architrave,
where faces inclined outwards [illegible]
because if we stand before them and two lines are drawn from
the eye, one touching the lowest and the other the highest
part of the building, the latter one to the upper part is a-
longest. Thus the nearer the line of sight to the upper part
is elongated, the more this gives to it an appearance as if
inclined backwards. But if the members of the facade are in-
clined forward in the manner just prescribed, they will appe-
ar vertical when viewed, and according to the measure of the
angle.(III, 5, 12). The fascias of the architrave are also so-
mewhat inclined forward, as well as the front surface of the
cornice slab; I cannot answer for the forward inclination of
the other architectural parts mentioned by Vitruvius, which are
unfortunately no longer in place on any Ionic monument, or e-
ven no longer exist.

What an appearance, for example, would the pediment in Mil-
etus have made, if with a height of about 19.58 ft., it had
overhung about 1.44 ft.? The refined feeling and eyes of the
Greeks must have once required in Doric buildings a pyramidal

A frieze decorated by pipes (vertical hollowed leaves) remains on the Ionic Temple in Aizani, that bears above the dentils a console band, and now was corrupted in the time of Hadrian, as stated.

g. The crowning cornice on most Attic monuments consists of a bold and moderately projecting inclined slab crowned by an echinus moulding and deeply undercut beneath, concealing an ogee with pearl bead, which passes into the surface of the frieze.(Fig. 318 A).

The front surface of the cornice is usually inclined somewhat outwards, so that the lowest point lies nearer the plane of the frieze than the upper one, an arrangement likewise found in the covering bands of the small Doric members, as for example, on the abacus of the column and ante capitals a and on the front surface of the cornice slab.

Vitruvius requires for Ionic columnar structures:-- "All members above capitals of columns, especially the architrave, frieze, cornice, tympanum, pediment and acroterias, must have their faces inclined outwards about one-twelfth their height, because if we stand before them and two lines are drawn from the eye, one touching the lowest and the other the highest part of the building, the latter one to the upper part is elongest, Thus the more the line of sight to the upper part is elongated, the more this gives to it an appearance as if inclined backwards. But if the members of the facade are inclined forward in the manner just prescribed, they will appear vertical when viewed, and according to the measure of the angle".(III, 5, 13). The fascias of the architrave are also actually inclined forward, as well as the front surface of the cornice slab; I cannot answer for the forward inclination of the other structural parts mentioned by Vitruvius, which are unfortunately no longer in place on any Ionic monument, or even no longer exist.

What an appearance, for example, would the pediment in Miletus have made, if with a height of about 19.68 ft., it had overhung about 1.64 ft.? The refined feeling and eyes of the Greeks must have once required in Doric buildings a pyramidal diminution of all parts of a temple for well understood opti-

monuments, the opposite was prescribed.

and the rules deduced therefrom, in the presence of such cus-
tomed facts! In the Ionic style everything is practically re-

surfaces of the aronitenve and cornice.

small in this case, as for example:--

Overhang of face of cornice there = 1 5/8 in.
for Doric members.

Overhang of abacus of ante on Pantheon = 1 7/8 in.

Overhang of face of cornice on Pinacothek = 2 1/4 ins.
Overhang of abacus of capital on the same = 1 1/2 ins.

the fact, that they received ornamentation, and that this was

of consent is not always the case; others are so high from

tion of those parts must remain without special effect.

and the friezes. We find them employed on Attic buildings, o

optical reasons, while for the frequently contemporary Ionic buildings, often standing in the immediate vicinity of Doric monuments, the opposite was prescribed.

Of what use is all the good researches on optical deceptions and the rules deduced therefrom, in the presence of such opposed facts! In the Ionic style everything is practically rejected, which in the Doric is prescribed as the highest perfection, as the most refined observance of all means for deceiving the eye! We here have the consistently carried out backward inclination of the columns, walls and architrave, frieze and the pediment, there the exactly vertical position of columns and walls, the forward inclination of the front surfaces of the architrave and cornice.

Vitruvius requires a forward inclination, so that the parts of the building may appear vertical to the observer; we generally prescribe a backward inclination, in order that the vertica may not seem to overhang! The measurements are further small in this case, as for example:--

| | |
|---|---|
| Overhang of fascias on architrave of Erechtheion = | 1/27 in. |
| Overhang of face of cornice there = | 1 5/16 in . |
| For Doric members. | |
| Overhang of abacus of ante on Parthenon = | 1 7/8 in. |
| Overhang of cornice over cell wall and frieze = | 2 5/8 in. |
| Overhang of face of main cornice of Propyleion= | 3 ins. |
| Overhang of face of cornice on Pinacothek = | 2 1/4 ins. |
| Overhang of abacus of capital on the same = | 1 1/2 ins. |

The overhang of these members may frequently be ascribed to the fact, that they received ornamentation, and that this was better presented to the eye in this way. But this application of ornament is not always the case; others are so high from the ground, or one is compelled to view them from so near a point of sight (as for example, the cornice placed over the frieze of the Parthenon), that such a slight forward inclination of those parts must remain without special effect.

But the simple undercut cornice gives place to a richer treatment of the main cornice, especially in monuments in Asia Minor, where the so-called dentils are inserted between it a and the frieze. We find them employed on Attic buildings, o

only on the caryatid portico and the Tower of the Winds in A-
thens. Our Vitruvius usually a writes horizontal dentil cornices,
struction, the projecting small ceiling beams, that were first
cut in stone on the rock-cut tombs in Lycia.

In a recessed in Tiryns, some vitruvian [illegible] traditional meth-
ods and thus appear as if suspended, while on other monuments,
like the caryatid portico, they were properly and elegantly
seem to rest on the lower projecting member and then express
the [illegible] in Asia. In Lycia [illegible] the
angle of the building arranged in accordance with this idea.
(Fig. 220 b). We find indeed on some buildings that the an-
gles are left solid, which may result from the not quite per-
fect completion of this portion of the cornice. The project-
ing angle appears to have been cut only after the setting of
the [illegible].

The dentils are usually crowned by a kind of bead band, re-
calling a piece [illegible] the dentil [illegible]
ly rested the undercut cornice slab.

[illegible] Choisy-
roll and E. Bussonnlier (Paris. 1904), a wild love of orna-
mentation overloaded the architectural members of the monumen-
tal buildings of the late period. The architects sought to
excel themselves therein, but which should occur only within
the given [illegible]. [illegible]
atrocities in scale were the only possible means of arousing
[illegible].

The [illegible] Sanctuary [illegible] at Ai-Khanum in Sogdi-
ana I may designate as the highest attainable limit in this
direction, where were joined to the bull heads and medallions
on the capitals also the frieze covered by masks and scroll
ornaments and the sunken leaves on the faces of the dentil b
locks (Fig. 220 a). Men desired to offer much and still per-
fected nothing. A general view of the entablature with the
starting block of a pediment is given by Fig. 219, corresspon-
ding to the Erechtheion in Athens, while Fig. 221 may afford
an idea of the early restored little Temple of Nike Apteros--
the temple of victory -- on the southwest point of
the Acropolis. [illegible]

only on the caryatid portico and the Tower of the Winds in Athens. They vividly recall a motive borrowed from wooden construction, the projecting small ceiling beams, that were first cut in stone on the rock-cut tombs in Lycia.

On a monument in Priene, they project from a vertical surface and thus appear as if suspended, while on other monuments, like the caryatid portico, they more properly and elegantly seem to rest on the lower projecting member and then express the function of support. We likewise find the dentils at the angle of the building arranged in accordance with this idea. (Fig. 320 b). We find indeed on some buildings that the angles are left solid, which may result from the not quite perfect completion of this portion of the cornice. The projecting angle appears to have been cut only after the setting of the cornice.

The dentils are usually crowned by a kind of head band, recalling a piece laid on the ceiling beams, upon which directly rested the undercut cornice slab.

According to the measurements and publications of S. Pontremoli and B. Haussoullier (Paris. 1904), a wild love of ornamentation overloaded the architectural members of the monumental buildings of the late period. The architects sought to excel themselves therein, but which should occur only within the given esthetic rules. Increasing the sculptures and monstrosities in scale were the only possible means of arousing attention.

The white marble pseudodipteral Temple at Miletus by Hermogenes I may designate as the highest attainable limit in this direction, where were joined to the bull heads and medallions on the capitals also the frieze covered by masks and scroll ornaments and the sunken leaves on the faces of the dentil b blocks (Fig. 320 a). Men desired to offer much and still perfected nothing. A general view of the entablature with the starting block of a pediment is given by Fig. 319, corresponding to the Erechtheion in Athens, while Fig. 321 may afford an idea of the partly restored little Temple of Nike Apteros--the wingless goddess of victory -- on the southwest point of the Acropolis of Athens, at which the form blindness of the

observer is not counted upon. Both temples desire correct [illegible] and not a jolt to harmony!

[illegible] pie were crowned by low pediments, that were in part adorned by groups of figures, as in the Doric order, but also had mediations and windows or were left without any decoration.

The monuments extant for these relatively few starting points; yet we know from Pausanias, that the externally Ionic Temple of Athena Alea in Tegea,[1] built by Scopas, possessed sculptures in the pediments -- the Calydonian Hunt being represented in one and the Combat of Telephos with Achilles in the other.

[illegible] was rest within the Doric scheme", and that only the cell embraced "the Ionic version." (See Cart. d. Rome. 1882, p. 93). He may indeed be right.

The pediment was covered by a main cornice similar to that [illegible] title. But if these existed, they were omitted on the pediment cornice. Like the mutules on the Doric order.[1]

Note 1. Yet no rule is without exception: different buildings of the late period in Asia Minor, likewise the pediment of the entrance portal on the Tower of Winds at Athens, exhibit dentils sometimes absolutely vertical, sometimes perpendicular to the line of the pediment.

Both the horizontal and the pediment cornices are crowned by an ogee moulding, the cyma, which was decorated by vertical anthemion ornaments and by lions' heads along the sides. (Fig. 318).

The cyma on the caryatid portico consists of a continuous [illegible] pulsion, and terminated above by a small ogee moulding with leaves.

The angles and apex of the pediment were also crowned by ornamental acroteria or small figures, as on Doric temples. (See the Xerxes monument at Xanthos, the angles of the Ionic Temple at Pergamon, and the Treasury of the Cnidians at Delphi.

observer is not counted upon. Bothe temples desire correct proportions and the possibility of the recognition of forms and not a jolt to harmony!

h. Pediment and pediment cornices. The ends of the temple were crowned by low pediments, that were in part adorned by groups of figures, as in the Doric order, but also had medallions and windows or were left without any decoration.

The monuments afford for these relatively few starting points; yet we know from Pausanias, that the externally Ionic Temple of Athena Alea in Tegea,[1] built by Scopas, possessed sculptures in the pediments -- the Calydonian Hunt being represented in one and the Combat of Telephos with Achilles in the other.

*Note 1. Adler believes, "that the external architecture was kept within the Doric scheme", and that only the cell possessed "the Ionic version." (See Cent. d. Bauw. 1882. p. 98). He may indeed be right.*

The pediment was covered by a main cornice similar to that of the horizontal entablature, if the latter were without dentils. But if these existed, they were omitted on the pediment cornice, like the mutules on the Doric order.[1]

*Note 1. Yet no rule is without exception; different buildings of the late period in Asia Minor, likewise the pediment of the entrance portal on the Tower of Winds at Athens, exhibit dentils sometimes absolutely vertical, sometimes perpendicular to the line of the pediment.*

Both the horizontal and the pediment cornices are crowned by an ogee moulding, the cyma, which was decorated by vertical anthemion ornaments and by lions' heads along the sides. (Fig. 319).

The cyma on the caryatid portico consists of a continuous quarter round ornamented by egg-shaped leaves, as on the Propyleion, and terminated abowe by a small ogee moulding with leaves.

The angles and apex of the pediment were also crowned by ornamental acroterias or small figures, as on Doric temples. (See the Nereid Monument at Xanthos, the angles of the Ionic Temple at Pergamon, and the Treasurn of the Cnidians at Delphi.

i. The roof construction and roof covering were generally the same as previously described.

On the Treasury of the Guidians at Delphi, besides the figure frieze, there also remains the tympanum decorated by figures, with also the ornamentation of the underside of the cornice, the acroteria at the ends and the apex. The complete representation of an archaic temple facade in its unfinished decoration is here assumed. No poetry, but everything is the plain truth! (Fig. 812, 822). The smallness of the pediment figures (height of the apex of the pediment is only 2.30 ft.) compelled a peculiar technical execution of the pediment group. Detached figures of such small size appeared scarcely appropriate, representations in relief were too ineffective-- hence it came to a compromise. The legs of the figures were only wrought in relief in the stone mass before the tympanum, and (Fig. 822). The polychromy must indeed have concealed the

Of formally and imposingly developed angle and middle acroteria are especially to be mentioned those from the Archaeion at Mantineia, about 5.15 ft. high in general with winged

ments of these are found in the Pergamon Museum in Berlin, a

from the Hellenistic period from the acroteria of the chief Temple on Samothrace, and the acroteria of the buildings at Pergamon from the period of Roman rule, among which the most beautiful are those of the Trajaneum.(Fig. 820).

If the roof gutter (cyma) of the archaic Artemeion at Ephesus was still flat-faced, adorned by skillfully wrought little figures (height of the cyma = 2.95 ft.), between which and without any connection were placed green colored lions' heads

form of less height (about 1.97 ft.), whose front surface was

was arranged scroll work in strong relief, a treatment that

i. The roof construction and roof covering were generally the same as previously described.

On the Treasury of the Cnidians at Delphi, besides the figure frieze, there also remains the tympanum decorated by figures, with also the ornamentation of the underside of the cornice, the acroterias at the ends and the apex. The complete representation of an archaic temple facade in its unfinished decoration is here assumed. No poetry, but everything is the plain truth! (Figs. 312, 322). The smallness of the pediment figures (height of the apex of the pediment is only 2.30 ft.) compelled a peculiar technical execution of the pediment group. Detached figures of such small size appeared scarcely appropriate, representations in relief were too ineffective-- hence it c.me to a compromise. The legs of the figures were only wrought in releief in the stone mass before the tympanum, and only from the seat upwards were the free figures developed. (Fig. 322). The polychromy must indeed have concealed the irregularity of the cutting of the sculptures in the tympanum.

Of formally and imposingly developed angle and middle acroterias are especially to be mentioned those from the Artemesion at Magnesia, about 9.18 ft. high in general with winged female forms, about which clung scroll work. Numerous fragments of these are found in the Pergamon Museum in Berlin, a and a larger fragment lies on the site of the ruins. Objects from the Hellenistic period form the acroteria of the chief Temple on Samothrace, and the acroterias of the buildings at Pergamon from the period of Roman rule, among which the most beautiful are those of the Trajaneum.(Fig. 323).

If the roof gutter (cyma) of the archaic Artemesion at Ephesus was still flat-faced, adorned by skilfully wrought little figures (height of the cyma = 2.95 ft.), between which and w without any connection were placed great colored lions' heads as water-spouts, then that of the Alexandrine exhibits an ogee form of less height (about 1.87 ft.), whose front surface was likewise beset with lions' heads spouting water, between which was arranged scroll work in strong relief, a treatment that remains characteristic of the entire further period.(Figs. 324 a, b). This is also expressed in the gutter from Magnesia-

cation, p. 65.

The underside of the cornice (geison) must be assumed on archaic buildings, after the precedent of the Treasury of the Siphians at Delphi as well as on other buildings, to be covered with ornament. The early Ionic art proceeded there in like manner as the early Doric, where on the porch statues in Athens, Xylon Siren and Sphinx-Sirens were displayed and painted on the underside of the pediment cornices.

The Ionic Sanctuary in Delphi and the Treasury at the Sanctuary of Athena at Delphi are tangible evidence of the friezes decorating the pediment; but evidence therefor is refused by most western monuments, and likewise in Asia Minor. The tympanum remains vacant, or medallions and window openings of different sizes must be accepted as the ornamentation, which in the last instance has the problem of admitting light and air (Fig. 288, after the Prussian publication, p. 47).

The detail of the formal treatment of the ceiling of the rectangular portico first depended on the material -- whether wood or stone. The absence or presence of a frieze on the entablature had no influence thereon. Constructed of wood, they could be assumed to be flat frame and panel ceilings, in the sense of the early Italian Renaissance, or strongly profiled coffers gave their energetic effect of light and shade. The former construction is shown by the Prussian publication on [illegible], as [illegible] Fig. 157 was also [illegible] by me.

Were stone chosen as the material of the ceiling, then would larger or smaller coffered construction be made of corresponding slabs or sashes, as shown by Fig. 142, after the restoration and the finds at Priene. Under the assumption of the absence of the frieze was the companion out representated according to the lines and the detail given accurately.

We saw it constructed of slabs and with sunken coffers and [illegible] the mouldings decorated by leaves and beads with similarly

-a-M., found in the Louvre, represented in the Prussian publication, p. 65.

The underside of the cornice (geison) must be assumed on archaic buildings, after the precedent of the Treasury of the Cnidians at Delphi as well as on other buildings, to be covered with ornament. The early Ionic art proceeded there in like manner as the early Doric, where on the poros statues in Athens, flying birds and lotus flowers were incised and painted on the underside of the pediment cornices.

The Nereid Monument in Xanthos and the Treasury of the Cnidians at Delphi are tangible evidence of the figure decoration in the pediment; but evidence therefor is refused by most western monuments, and likewise in Asia Minor. The tympanum remains vacant, or medallions and window openings of different sizes must be accepted as the ornamentation, which in the last instance has the prosaic problem of admitting light and air to the floor, like the three pediment windows in Magnesia-a-M. (Fig. 325, after the Prussian publication. p. 47).

The detail of the formal treatment of the ceiling of the peripteral portico first depended on the material -- whether wood or stone. The absence or presence of a frieze on the entablature had no influence thereon. Constructed of wood, they could be assumed to be flat frame and panel ceilings, in the sense of the arly Italian Renaissance, or strongly profiled coffers gave their energetic effect of light and shade. The former construction is shown by the Prussian publication on Magnesia-a-M., on which assumption Fig. 150 was also executed by me.

Were stone chosen as the material of the ceiling, they would larger or smaller coffered construction be made of corresponding slabs or ashlars, as shown by Fig. 149, after the restoration and the finds at Priene. Under the assumption of the absence of the frieze was the companion cut represented according to the finds and the detail given accurately.

We saw it constructed of slabs and with sunken coffers and resting on architrave beams at the Erechtheion, gleaming with broght color decoration with the addition of metallic ornament, the mouldings decorated by leaves and beads with similarly

roofed coffered slabs, at the same time forming the roof at
the Sanctuary, and made the column stand with its base
on the Nereid Monument in Xanthos.

Many Corinthian buildings demonstrate in a similar way, be-
ing hypaethral structures that do not contain a cella
rule and show in the interior an order different from that
on the exterior. Their arrangement in the style order as a
rule is according to the external angular portico. In this
respect it stands by no means unlikely that the Tem-
pia, whose circle of columns was of the Ionic order, and whose
porticos bore Doritis, its cell walls being decorated on the
inside by Corinthian half columns, according to the descript-
ion of the Finds and Dr. Adler's restoration in the great Ger-
man work on Olympia. As for the construction of the roof and
the interior, both are made probable, but are not certain in
all parts. I say this here not as blame, not only for tedio-
ity, not to awaken belief and a false conception, as all man
[illegible] by the Tower-
sufficient error has been produced in the domain of research
in the history of architecture. This warns one to exert the
most extreme care.

As a purely Ionic circular building is only to be mentioned
the monopteral structure on the Acropolis in Athens -- the
Sanctuary of Rome and Augustus without a cell, whose columns
are imitated from those of the Erechtheion and bear a plain
[illegible]
No stone of the building is left on another, as it only re-
mains in fragments. No restoration of it is therefore cert-
ain in all points.

[illegible] Ionic
tico with a Doritbian colonnade in the interior of the cell.
[illegible]
in an [illegible]. [illegible] the [illegible] a wap-
ped, others under a n unroofed roof, while yet others leave
[illegible]
ionally. -- The Tholos in Delphi, according to the evidence,
[illegible] a Doric
[illegible]

moulded coffered slabs, at the same time forming the roof at the Pandroseion, and made the joined slabs with false beams on the Neried Monument in Xanthos.

Most circular buildings (tholos) are in a mixed style. Even some longitudinal structures form an exception from the rule and show in the interior an order different from that on the exterior. Their arrangement in the style order as a rule is according to the external auunlar portico. In this sense is first to be mentioned only the Philippeion in Olympia, whose circle of columns was of the Ionic order, and whose cornices bore dentils, its cell walls being decorated on the inside by Corinthian half columns, according to the description of the finds and Dr. Adler's restoration in the great German work on Olympia. As for the construction of the roof and the interior, both are made probable, but are not certain in all parts. I say this here not as blame, but only for posterity, not to awaken belief and a false conception, as all was once. By the further publication of doubtful coins, more than sufficient error has been produced in the domain of research in the history of architecture. This warns one to exert the most extreme care.

As a purely Ionic circular building is only to be mentioned the monopteral structure on the Acropolis in Athens -- the Sanctuary of Rome and Augustus without a cell, whose columns are imitated from those of the Erechtheion and bear a plain frieze and a cornice without dentils.(See Antike Denkmaler). No stone of the building is left on another, as it only remains in fragments. No restoration of it is therefore certain in all points.

The Tholos in Epidauros had an external circular Doric portico with a Corinthian colonnade in the interior of the cell. Both are certain in their parts. How the building was covered is not determined. Some assume the structure beneath a stepped, others under a n unbroken roof, while yet others leave the cell under the open sky. The first would be best artistically. -- The Tholos in Delphi, according to the evidence, had likewise an external circular Doric portico and a Doric entablature. The internal side of the cell wall was decorated

by Doricising half columns, judging from the finds now in the Museum at Delphi, just as at the Philippeion at Olympia. (See my Essay in the Jahr. d. Oest. Inst. 1905.). The conical roof finds now in the Museum at Delphi.

Particularly [illegible] the geometrical in the [illegible]-ian half columns, was also the Asiaticism on Samothrace.

On the second stylobate -- [illegible] of Apollo at Delphi -- [illegible] cell -- balanced the Temple at Tegea according to the statement of Pausanias. It must have had an external circular Doric portico, in the interior being adorned by an Ionic colonnade with Corinthian columns in the vestibule. Now the Ionic columns were arranged it is now hard to say. There might have been two series of small columns above each other, as for example, at the Doric Temple at Paestum, but a procedure may also have been chosen as for the Temple in Priene; continuous half columns or even free columns detached from the wall and extending from floor to ceiling, which bore the architrave, the frieze adorned by figures and a covering cornice without dentils. Remains of these parts are certain (a fragment of a capital and the frieze in the British Museum at London), but not configured in details, as they are preserved in the monographs of Cockerell and of Stackelberg. The shape of the Ionic capital is doubtful and also not very probable; how the side volutes and against the wall pier is not known. Certain is only the mere of the connection of the half columns with the wall [illegible] [illegible].

The Corinthian capital has disappeared.

[illegible] the Doric Propylaion at Athens cannot be omitted here.

If in general Springer-Michaelis says (1907, p. 124), "but pure Doric prevails elsewhere in Greece," this is indeed a fault of memory.

[illegible] -- are to be noted everywhere on the Alexandrine b[illegible] triglyphs -- [illegible] north portico of the Market in Priene etc.

[illegible] Corinthian Capital. -- The Corinthian capital [illegible]

by Corinthian half columns, judging from the finds now in the Museum at Delphi, just as at the Philippeion at Olympia. (See my Essay in the Jahr. d. Oest. Inst. 1906.). The conical roof of the building was covered by marble tiles, as proved by the finds now in the Museum at Delphi.

Externally Doric, but subdivided in the interior by Corinthian half columns, was also the Arsinoeion on Samothrace.

To the second category -- mixture of styles with rectangular cell -- belonged the Temple at Tegea according to the statement of Pausanias. It must have had an external circular Doric portico, in the interior being adorned by an Ionic colonnade with Corinthian columns in the vestibule. How the Ionic columns were arranged it is now hard to say. There might have been two series of small columns above each other, as for example, at the Doric Temple at Paestum, but a procedure may also have been choses as for the Temple in Phigaleia; continuous half columns or even free columns detached from the wall and extendinm froc floor to ceiling, which bore the architrave, the fireze adorned by figures and a covering cornice without dentils. Remains of those parts are certain (a fragment of a capital and the frieze in the British Museum at London), but not confirmed in details, as they are presented in the monographs of Cockerell and of Stackelberg. The abacus of t the Ionic capital is doubtful and also not very probable; how the side volutes end against the wall pier is not known. Certain is only the mode of the connection of the half columns with the wall piers and the peculiar bosses.(Figs. 326, 327).

The Corinthian capital has disappeared.

Another reference to the Ionic colonnade in the interior of the Doric Propyleion at Athens cannot be omitted here.

If in general Springer-Michaelis says (1907, p. 131), "but pure Dorism prevails elsewhere in Greece," this is indeed a fault of memory.

Combinations of the Doric and Ionic motives -- dentils with triglyphs -- are to be noted everywhere on the Alexandrine b buildings in Asia Minor.(Examples on the main cornice of the north portico of the Market in Priene etc.

C. Corinthian Order. -- The Corinthian order does not oc-

[illegible] Ionic; it is rather based on the styles that earlier attained [illegible] prehistoric in its characteristics." [1] The greatest characteristic, the column with the corolla or bell capital was already found in Thebes on the magnificent structures of the 18th dynasty (1447-1279 B.C.); but we likewise find it on the sculptures at Nineveh and on the Grecian mainland; in the early period in the Temple of Apollo at Phigaleia, in the interiors of the Tholos at Epidauros and of the Tholos at Delphi.

Note 1. See Semper, Braun und Rabe.

Vitruvius states that the capital was invented by the sculptor Callimachus [2], and he relates the well known myth of the nurse, that placed a basket of flowers covered by a stone slab on the grave of her young mistress in Corinth, which was then enclosed by a sprouting acanthus plant, and thus it furnished [illegible] ital. He then made the Corinthian column after this model, [illegible] the erecting structures of the Corinthian order. [3]

Note 2. Probably from Athens; lived about the 90 B. Olympiad. (447 B.C.).

Note 3. See Vitruvius. Book IV. 2. 10.

In the fourth Book, he further states, that the Corinthian order itself has no special rules for the cornice and the other decorations, "but either employs modifications on the main cornice from the arrangement of the triglyph members with dress on the architrave after the Doric style, or a frieze with deentils, adorned by reliefs, and a cornice according to Ionic principles."

Thus from the two orders, to which was added a new capital, a third order was created for the style.

But this novelty in form did not merely consist in the arrangement of the cornice, nor in the use of the Egyptian bell capital, and which in the later period was to supplant the other orders, but in the elastically poised frieze, that according to Semper, is treated "as a gently poised nave, which elastically receives the load of the frame of the ceiling and

occur with entirely individual forms, like the Doric and Ionic; it is rather based on the styles that earlier attained ripeness and perfection. But "it is likewise very primeval and prehistoric in its characteristics." [1] The greatest characteristic, the column with the corolla or bell capital was already found in Thebes on the magnificent structures of the 19 th dynasty (1447-1273 B.C.); but we likewise find it on the sculptures at Nineveh and on the Grecian mainland; in the early period in the Temple of Apollo at Phigaleia, in the interiors of the Tholos at Epidauros and of the Tholos at Delphi.

*Note 1. See Semper, Braun and Reber.*

Vitruvius states that the capital was invented by the sculptor Callimachus [2], and he relates the well known myth of the nurse, that placed a basket of flowers covered by a stone slab on the grave of her young mistress in Corinth, which was then enclosed by a sprouting acanthus plant, and thus it furnished to the passing Callimachus the motive for the new form of capital. He then made the Corinthian column after this model, which fixed the harmonious proportions and the principles of the erecting structures of the Corinthian order. [3]

*Note 2. Probably from Athens; lived about the 93 d. Olympiad.(464 B.C.).*

*Note 3. See Vitruvius. Book IV. 9. 10.*

In the fourth Book, he further states, that the Corinthian order itself has no special rules for the cornice and the other decorations, "but either employs modillions on the main c cornice from the arrangement of the triglyph members with drops on the entablature after the Doric style, or a frieze with d dentils, adorned by reliefs, and a cornice according to Ionic principles."

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transmits it to the architrave."

presence and acceptance of the new style are found in those monuments, on which the different orders occur together, in the interiors of the Temples at Phigaleia and at Miletus, the Tholos at Epidauros and the Philippeion in Olympia, the Arsinoeion on Samothrace, the Temple of Athena Alea in Tegea and the Tholos in Delphi, but only in the period of Alexander did it find general acceptance and become the prevailing order; after the complete destruction of the independence of the Greek states and people, it was fostered and cultivated by the splendor-loving masters.

evidence of this most auspicious architectural style are preserved for us in the graceful Choragic Monument of Lysicrates in Athens and in the Temple of Olympian Zeus, located on a high terrace in the lower city of Athens, a monument that in seeks its equal in all ages, and whose construction continued for six and a half centuries (it was finished 650 years after the laying of the foundation stone), although with interruptions, from the Pisistratidae until Hadrian.

We wonder at the charming and delicately rendered details of the Ionic order, the Corinthian capital [illegible] diameter, and on the other at the gigantic shafts of about 6.58 ft. diameter and nearly [illegible] ft. in length, as well as at the marble beams of the architrave over 21.32 ft. long.

Exactly as in the Doric and Ionic styles of architecture, we here likewise find the same forms, sometimes on the most graceful little architectural structures, sometimes on the largest colossal edifices.

The material employed on most Corinthian monuments in Greece and Asia Minor is white marble, whose fine crystalline grain is particularly suited for the skillful execution of the numerous small sculptures and ornaments.

[illegible] of this style in comparison with the two others. Color deco-

transmits it to the architrave."

In accordance with what has been said, the marks of the appearance and acceptance of the new style are found in those monuments, on which the different orders occur together, in the interiors of the Temples at Phigaleia and at Miletus, the Tholos at Epidauros and the Philippeion in Olympia, the Arsinoeion on Samothrace, the Temple of Athena Alea in Tegea and the Tholos in Delphi, but only in the period of Alexander did it find general acceptance and become the prevailing order; after the complete destruction of the independence of the Grecian states and people, it was fostered and cultivated by their splendor-loving masters.

The remains of this order left to us are scanty, both on Hellenic (European) and likewise on Asiatic soil; but precious evidence of this most sumptious architectural style are preserved for us in the graceful Choragic Monument of Lysicrates in Athens and in the Temple of Olympian Zeus, located on a high terrace in the lower city of Athens, a monument that in magnitude and splendor, in beauty and massiveness of materials, seeks its equal in all ages, and whose construction continued for six and a half centuries (it was finished 650 years after the laying of the foundation stone), although with interruptions, from the Pisastratides until Hadrian.

We wonder at the charming and delicately membered details on the one, the slender half columns scarcely 0.98 ft. in diameter, and on the other at the gigantic shafts of about 6.56 ft. diameter and nearly 55.76 ft. in height, as well as at the marble beams of the architrave over 21.32 ft. long.

Exactly as in the Doric and Ionic styles of architecture, we here likewise find the same forms, sometimes on the most graceful little architectural structures, sometimes on the mightiest colossal temples.

The material employed on most Corinthian monuments in Greece and Asia Minor is white marble, whose fine crystalline grain is particularly suited for the skilful execution of the numerous small sculptures and ornaments.

Polychromy generally becomes of less importance in the works of this style in comparison with the two others. Color deco-

ses of perishable colors must in time yield to the n[illegible]

The gilding of certain parts may perhaps have been more commonly employed, than on the buildings of the Doric and Ionic orders.

A. The Substructure. -- The temples of this order likewise stand on a substructure of several steps, that is constructed of smooth blocks of stone in the manner already described; this is either the plain rectangular form of step, or that with a small rebate on the lower angle of the step, like those already found on the Doric Temple in Paeum.

[illegible] cornices mouldings are said to occur, but these were found in [illegible] per be determined with certainty, and they also give cornice [illegible] bases for protecting the exposed angles, which had not been [illegible].

The only remains of larger temples of this style are those of the Olympeion in Athens, and those of the so-called Temple of Zeus in Labranda; the steps have entirely disappeared at the corner and the substructure no longer remains in its original [illegible] of the inner row on the south side still stand erect, a third having been overthrown by the storm of 1852. The steps of the other are now in great part concealed by rubbish and ruins, so that their number cannot even be determined. Under [illegible] "curvatures", or of their intentional or unintentional eccentricity, [illegible] columns of the Olympeion are no longer in condition to afford measurements to 1/32 inch.

b. Cell Walls. -- Likewise of these again few remains e[illegible]

decoration here chiefly gives place to relief ornament; the use of perishable colors must in time yield to the mode of natural ornamentation with colored stones, and thus to a monumental polychromy.

The gilding of certain parts may perhaps have been more commonly employed, than on the buildings of the Doric and Ionic orders.

A. The Substructure. -- The temples of this order likewise stand on a substructure of several steps, that is constructed of smooth blocks of stone in the manner already described; this is either the plain rectangular form of step, or that with a small rebate on the lower angle of the step, like those already found on the Doric Temple in Nemea.

On the upper corners of the steps of the Temple in Labranda, echinus mouldings are said to occur, but these were found in such a damaged condition, that their original form can no longer be determined with certainty, and they also give occasion for the conjecture, that they are merely the vestiges of the bosses for protecting the exposed angles, which had not been dressed off.(Fig. 328).

The only remains of larger temples of this style are those of the Olympeion in Athens, and those of the so-called Temple of Zeus in Labranda; the steps have entirely disappeared at the former and the substructure no longer remains in its original extent; only 13 columns at the southwest angle and two of the inner row on the south side still stand erect, a third having been overthrown by the storm of 1852. The steps of t the other are now in great part concealed by rubbish and ruins, so that their number cannot even be determined. Under these circumstances, there can be no consideration of any "curvatures", or of their intentional or unintentional existence; the 4 + 3 columns in the front row on the south and east facades of the Olympeion are no longer in condition to afford measurements to 1/25 inch.

b. Cell Walls. -- Likewise of these again few remains e exist, which do not differ in form and construction from those previously described. In Labranda the cell wall had a base and cap moulding after Ionic types.

absolutely vertical, as for the Ionic temple.

with rich mouldings, arranged in three bands like the architrave, separated by beaded astragals, cornice mouldings and coves.(Fig. 329).

c. Columns, as in the Ionic order, are divided into three parts, for they consist of base, shaft and capital; they are not inclined towards the cell wall, but are accurately vertical and are of slender proportions, like the Ionic,with eight 6 diminution and entasis.

The lower diameter of the column does into its height (including base and capital) as follows:--

On Olympeion in Athens 2 4/5 times.

On Temple of Zeus in Lebrendo 9 1/2.

On Temple of Olantina Ceasar in Ephesus 10 1/2.

"The upper diameter is from 1/7 to 1/3 less than the lower."

The base is usually the Attic Ionic on a square plinth; the mouldings are sometimes plain, sometimes decorated by indentations. In the Temple of Zeus at Olympia, it is equal to or rather bigger than the lower diameter of the column.(Fig. 330).

After the Ionic system, 24 flutes of semicircular section surround the shaft of the column, are separated from each other by fillets, and in rounded forms at top and bottom. In Lacania and elsewhere, a part of the scotia is occupied by a tablet, on which the name of the benefactor stands, at whose cost the columns were erected and finished, and whose meaning is, for example:--

"Leon Koratos, son of Leon, as he promised, dedicates this column with its base and capital."

On the Monument of Lysicrates, the flutes accordingly end in the form of recurved leaves; a plain groove between these and the lower row of leaves on the bell of the capital was indeed originally filled by a metal band. An astragal, a round and fillet, treated as a band, as on the Olympeion, separates the shaft from the capital.

Judging from the positions of the columns, they were built absolutely vertical, as for the Ionic temple.

Doorways exhibit, as for example in Labranda, high jambs with rich mouldings, arranged in three bands like the architrave, separated by beaded astragals, echinus mouldings and coves.(Fig. 329).

c. Columns, as in the Ionic order, are divided into three parts, for they consist of base, shaft and capital; they are not inclined toward the cell wall, but are accurately vertical and are of slender proportions, like the Inoic,with slight d diminution and entasis.

The lower diameter of the column goes into its height (including base and capital) as follows:--

| | |
|---|---|
| On Olympeion in Athens | 8 4/5 times. |
| On Monument of Lysicrates | 10 7/10. |
| On Temple of Zeus in Labranda | 9 1/2. |
| On Temple of Claudius Caesar in Ephesus | 10 1/2. |

The upper diameter is from 1/7 to 1/8 less than the lower. The base is usually the Attic Ionic on a square plinth; the mouldings are sometimes plain, sometimes decorated by interwoven bands, or laurel leaves then cover the torus. Including the plinth, it is equal to or rather higher than the lower diameter of the column.(Fig. 330).

After the Ionic system, 24 flutes of semicircular section surround the shaft of the column, are separated from each other by fillets, and end in rounded forms at top and bottom. In Labranda and elsewhere, a part of the scotia is occupied by a tablet, on which the name of the benefactor stands, at whose cost the columns were erected and finished, and whose meaning is, for example:--

"Leon Kointos, son of Leon, as he promised, dedicates this column with its base and capital."

On the Monument of Lysicrates, the flutes exceptionally end in the form of recurved leaves; a plain groove between these and the lower row of leaves on the bell of the capital was indeed originally filled by a metal band. An astragal, a round and fillet, treated as a band, as on the olympeion, separates the shaft from the capital.

the astragal, is little greater than the lower diameter of t
by its bell form.

The low and tense echinus of the Doric and Ionic capitals, that expands under the weight of the entablature, is here pe- burden and transmits it to the shaft.

pointed leaves surrounded the bell at its base on the shaft; behind these extended to its upper margin closely set incurv- ended leaves.(Fig. 3C3).

Note 1. Also compare the transitional form from Cyprus, (Original in British Museum in London; Fig. 3C4).

capital, that on the Theatre of Dionysos and on the Tower of' omon). But the plant [illegible] for ornaments the plants native to their country, instead of with narrow edge leaves springing from behind them, and all wrought in relief, composed the decoration. Not neither for the Egyptian capital nor for the Greek was the load laid dir- ectly on the bell; a square slab was interposed between the bell or basket (calathos) and the architrave.

This abacus also not projected beyond the edge of the bell in the former; in the second, it projects in accordance with

ering slab (measuring about 1/6, or according to Vitruvius about 1/7 of the height of the capital), whose sides slanton ly at the angles, or are there cut off.

The diagonal of this abacus sometimes equals twice the dia- eter of the capital, and sometimes is [illegible]

"More refined and slenderer" than the Ionic, according to Vitruvius, for its height including the abacus, but without the astragal, is little greater than the lower diameter of t the shaft of the column, the capital is chiefly characterized by its bell form.

The low and tense echinus of the Doric and Ionic capitals, that expands under the weight of the entablature, is here replaced by a high moulding, that like the frieze, receives the burden and transmits it to the shaft.

The Egyptian prototype [1] imitated from the corollas of native plants, first bore no relief ornament; a circle of broad pointed leaves surrounded the bell at its base on the shaft; behind these extended to its upper margin closely set lancet-shaped leaves.(Fig. 331).

*Note 1. Also compare the transitional form from Cyprus. (Original in British Museum in London; Fig. 332).*

But we find the same arrangement on one kind of Corinthian capital, that on the Theatre of Dionysos and on the Tower of Winds in Athens, as well as on buildings in Asia Minor.(Pergamon). But the plant ornament is different; the Greeks chose for ornaments the plants native to their country, instead of the Egyptian flora, preferring those species that could be used in relief and were typical. A circle of acanthus leaves with narrow sedge leaves springing from behind them, and all wrought in relief, composed the decoration. But neither for the Egyptian capital nor for the Greek was the load laid directly on the bell; a square slab was interposed between the bell or basket (calathos) and the architrave.

This abacus does not project beyond the edge of the bell in the former; in the second, it projects in accordance with Doric models, and it is not shaped like a heavy slab without ornament, but as a delicately moulded and not very high covering slab (measuring about 1/6, or according to Vitruvius, about 1/7 of the height of the capital), whose sides abandon the straight line and in gently curved lines intersect sharply at the angles, or are there cut off.

The diagonal of this abacus sometimes equals twice the height of the capital, and sometimes is rather less.(Vitruvius

requires in Fig. 8[illegible], that b o = 2 b, while on the Olympieion, the length b o is less than 2 b. He makes the rise of the arc = 1/9 b d, while in many cases it is considerably less).

The profile of the abacus is either an echinus moulding with fillet and cove, or an echinus moulding with fillet, cove and another fillet. (See Movement of Lysicrates in Fig. 8[illegible]).

The heads (antaeals) of the Ionian bell capitals were originally painted, were in relief in the Doric style, and are treated as rounds with fillet and scoulyée as above.

Besides this simple painted decoration of the bell, there already occurs at an early date in Egyptian Thebes a second and richer ornamentation thereof, which combines relief with painted ornament. Four of the large leaves enclosing the bell extend up to its top and there curve downward like volutes; (Fig. 8[illegible]): the spaces produced between these leaves near the top of the bell are adorned with painted ascending horns. In a still tasteless manner, we find this arrangement of the ornamentation of the capital on that found in Phigaleia, though entirely changed into relief; merely the abacus here remains heavy and is painted in the archaic manner. (Fig. 8[illegible]).

[illegible] of the triangular corners of the abacus, projecting beyond the edge of the bell, and appear to support these projecting parts.

A more perfected development is shown by the capitals of the half columns of the Choragic Monument of Lysicrates (384 B.C.) in Athens. The movement of the leaves and of the volutes is rendered more labored, and the entire capital bears more the stamp of an experiment in sculpture, but a charming creation still remains.

The capitals of the Olympieion in Athens exhibit the form, that later became typical, with two rows of acanthus leaves, the volutes resting on them, and the flower rising above the abacus.

New light has been cast upon the history of the Corinthian capital by the finds at the Tholos in Epidauros and in Delphi, the former being a work of the younger Polykleitos, who worked about the middle of the 4 th century.[1] (See Fries. 2[illegible], 88[illegible]).

requires in Fig. 331, that b c = 2 h, while on the Olympeion, the length b c is less than 2 h. He makes the rise of the arc = 1/9 b d, while in many cases it is considerably less).

The profile of the abacus is either an echinus moulding with fillet and cove, or an echinus moulding with fillet, cove and another fillet.(See Monument of Lysicrates in Fig. 331).

The bands (astragals) of the Egyptian bell capital were merely painted, were in relief in the Ionic style, and are treated as rounds with fillet and apophyge as shown.

Besides this simple painted decoration of the bell, there already occurs at an early date in Egyptian Thebes a second and richer ornamentation thereof, which combines relief with painted ornament. Four of the large leaves enclosing the bell extend up to its top and there curve downward like volutes; (Fig. 331); the spaces produced between these leaves near the top of the bell are adorned with painted ascending forms. In a still tasteless manner, we find this arrangement of the ornamentation of the capital on that found in Phigaleia, though entirely changed into relief; merely the abacus here remains heavy and is painted in the archaic manner.(Fig. 335).

The volutes conceal in the most beautiful way the underside of the triangular corners of the abacus, projecting beyond t the edge of the bell, and appear to support these projecting parts.

A more perfected development is shown by the capitals ofthe half columns of the Choragic Monument of Lysicrates (334 B.C.) in Athens. The movement of the leaves and of the volutes is perhaps more labored, and the entire capital bears more the stamp of an experiment in sculpture, but a charming creation still remains.

The capitals of the Olympeion in Athens exhibit the form, that later became typical, with two rows of acanthus leaves, the helices resting on them, and the flower rising above the abacus.

New light has been cast upon the history of the Corinthian capital by the finds at the Tholos in Epidauros and in Delphi, the former being a work of the younger Polycleitos, who worked about the middle of the 4 th century.[1] (See Figs. 333, 334).

The tradition, that he was the pupil of Kanpyles, is even cer-

Tell. Athens and Paris, 1[illegible] th perr (1[illegible]). p. [illegible]; "Pausanias mentions as most remarkable the Theatre and the circular edifice termed Tholos, both works of Polyeletos. It is known that there were two famous sculptors of that name; Polyeletos

[illegible] d. Greek. Kunstler. I. 2 d edition, p. [illegible]

The stonecutters' marks found on the columns of the Tholos

The latter was erected before the year 338, probably about 3 [illegible], but one cannot go beyond that date. The construction

[illegible] some years later. In any case, it is the work of

der, same as the Theatre."

For the omitted in Belchi, see my essay in Oest. Jahresh.

Everyone will agree with the conclusions stated in Note 1 above, who has seen and carefully examined the architectural details of the Tholos. The forms have no relation to those

[illegible] Tholos in Argos. The Corinthian capital in the Greek mother country

[illegible]

*Note 1. See Robert, C. Archaeologische Märchen aus alter und neuer Zeit in Phil. Unters., pub. by Kiessling & von Willamowitz-Mollendorf. Heft 10. p. 198. "We know nothing whatever concerning the family relations of the younger Polycleitos. The tradition, that he was the pupil of Naukydes, is even chronologically possible, but is very doubtful.-- That he was t the architect of the Theatre and of the Tholos of Epidauros appears probable from the architectural forms of both buildings." Also see Foucart. Edifices d'Epidaure. Bull. d. Corr. Hell. Athens and Paris. 14 th year (1890). p. 592-594; "Pausanias mentions as most remarkable the Theatre and the circular edifice termed Tholos, both works of Polycleitos. It is known that there were two famous sculptors of that name; Polycleitos the elder, who flourished in the 5 th century, and Polycleitos the younger, who lived in the early part of the 4 th century. Brunn (Geschichte d. Griech. Künstler. I. 2 d edition, p. 152, 162. Stuttgart. 1888-1889) attributes them without hesitation to Polycleitos the elder. This opinion has been commonly expressed, but it is not based on any proof.*

*The stonecutters' marks found on the ashlars of the Tholos show that the Tholos is of the 4 th and not of the 5 th century, and it is further stated concerning a fixed date:-- " "Hence the Tholos was built after the Temple of Asclepios. The latter was erected before the year 352, probably about 3 375, but one cannot go beyond that date. The construction of the Tholos was undertaken afterwards, perhaps immediately, perhaps some years later. In any case, it is the work of Polycleitos the younger and not that of Polycleitos the elder, same as the Theatre."*

*For the capital in Delphi, see my Essay in Oest. Jahresh. 1906. "The Corinthian Capital in Phigaleia;" Fig. 335.*

Everyone will agree with the conclusions stated in Note 1 above, who has seen and carefully examined the architectural details of the Tholos. The forms have no relation to those of the 5 th century, which likewise occurs on the Tholos in Delphi. The Corinthian capital in the Grecian mother country was adopted to a greater extent only in the second half of the 4 th century. (Epidauros, Tegea, Olympia, Samothrace, Delphi).

The arrangement then expressed by Röttlicher [1] was indeed confused by the doubtful statements of Brunn (see his work), that the Corinthian capital of the Tholos in Epidauros was about 100 years earlier than that of the Erechtheion, and it is indeed to be considered as refuted.

Note 1, Gesch. d. Baus. 1885. p. 588.

After its precedence in Sounion (480 B.C.) and Delos, the capital indeed appears in a tasteless form still, but already much more importantly developed (380 B.C.) in Epidauros, then in Olympia and on Samothrace. Since Scopas is regarded as a contemporary of the younger Polycletus, each combined the talents of a great architect and of a sculptor; then the capital on the Temple of Athena Alea in Tegea mentioned must have had the same date of origin as that in Epidauros.

Likewise on the Dionysosion near Vitetus, besides the bolster capitals in the interior of the cell, there are given two Corinthian half columns. (See Antiquities in Ionia, pub. by Society of Dilettanti. Germ. Edition. 1829. Pl. 2. Chap. 3; text volume, p. 124), that must have stood at the right and left of the [illegible] were restored by conjecture, from the form represented by a half capital at a larger scale." The place exhibits close alliance to the capitals found within the Tholos in Epidauros.

A later capital like the Corinthian and from Tegea-Arbiles, to be found in the museum at Jarcuse, is designated as "arcaico"(Mis. 810), which is indeed scarcely appropriate.

Itruvius requires for the lower part of the capital the [illegible] the scoppyle and the astragal.

The capital is treated alike on all four sides. Between the bell is decorated by volutes or not, and it again adopts the general relations of the Doric capital, since it among the [illegible] combined with its essential form, is indeed due the accuracy over all other forms of capital in later times, even to the present day!

Another form of capital -- the so-called palm capital -- was indeed likewise introduced from Egypt and was particularly

The erroneous view expressed by Bötticher [1] was indeed caused by the doubtful statements of Brunn (see his work), that the Corinthian capital of the Tholos in Epidauros was about 100 years earlier than that of the Philippeion, and it is indeed to be considered as rejected.

*Note 1. Cent. d. Baum. 1885. p. 236.*

After its precedence in Phigaleia (430 B.C.) and Delphi, t the capital indeed appears in a tasteless form still, but already much more importantly developed (350 B.C.) in Epidauros, and in Olympia and on Samothrace. Since Scopas is regarded as a contemporary of the younger Polycleitos, each combined the talents of a great architect and of a sculptor; then the capital on the Temple of Athena Alea in Tegea mentioned must have had the same date of origin as that in Epidauros.

Likewise on the Didymaeon near Miletus, besides the bolster capitals in the interior of the cell, there are given two Corinthian half columns. (See Antiquities in Ionia, pub. by Society of Dilettanti. Germ. Edition. 1829. Pl. 8. Chap. 3; text vnlume, p. 140), that must have stood at the right and left of the main entrance doorway." The volutes were destroyed and were restored by conjecture, from the form represented by a half capital at a larger scale." The piece exhibits close alliance to the capitals found within the Tholos in Epidaurosa

A pier capital like the Corinthian and from Megara-Hyblea, to be found in the Museum at Syracuse, is designated as "Archaic"(Fig. 310), which is indeed scarcely appropriate.

Vitruvius requires for the lower part of the capital the same diameter as that of the upper end of the shaft, excluding the apophyge and the astragal.

The capital is treated alike on all four sides, whether the bell is decorated by volutes or not, and it again adopts the general relations of the Doric capital, since it shows the same free suitability for peripteral designs. To this fact, combined with its beautiful form, is indeed due its supremacy over all other forms of capital in later times, even to the present day!

Another form of capital -- the so-called palm capital -- w was indeed likewise introduced from Egypt and was particularly

employed for the middle colonnade of two-aisled stoas.(Fig. 388). The Hadrian prototype from Cole exhibits the plan and recessed abacus (Fig. 387), while the pieces in Delphi and Ferguson show round abaciuses (Fig. 389), that found at the foot of Propylaea in Athens having the moulded projecting abacus of the early Corinthian capital, where a peculiarity is to be noted.

The lower and vacant corners of the abacus are filled by a raised leaf (Fig. 390), an arrangement resulting from the same feeling, which later led the architects of the Augustan period to bevel the said angles with rosettes, and also those of the middle ages to seek and find a similar transition between the square plinth and the circular base of the shaft. -- Instead of the lanceolate leaves on the bell decorated by acanthus leaves, there also occur broad water leaves, that are similarly transferred to the pier and ante capitals, as in Pylaeus, for example.

The route followed by these forms of capitals -- with sedge and palm leaves -- passes from Egypt across Asia Minor to the Mediterranean, these being the articles last imported!

Fluted columns, half columns, inclined piers, arches and pilasters, are also affected by this order, under the same association of a triple division into base, shaft and capital. For pilasters the shaft is quite plain, or as an innovation there occurs on them a border with sunken panel. (Hadrian's Gate and Monument of Philopappus in Athens, Doorway in Baiae). Their capitals bear the form of the capital of the antae.

[illegible]

Derived from the corresponding column order capital, may serve [illegible] round bear the Propylaion at Eleusis, at least still preserved in fragments, that perhaps once supported a tripod, may also be mentioned here. Under Lion-heads with lions' paws a project above the series of acanthus leaves at the angles of the capital, and they are connected by beautifully intertwining scroll arrangements; the recurved abacus,as on the columns capitals, has a slight curve outward at the middle, that does

employed for the middle colonnade of two-aisled stoas.(Fig. 338). The Egyptian prototype from Soleb exhibits the high and recessed abacus (Fig. 337), while the pieces in Delphi and Pergamon show round abacuses (Fig. 340), that found at the Stoa of Eumenes in Athens having the moulded projecting abacus of the early Corinthian capital, where a peculiarity is to be noted.

The lower and vacant corners of the abacus are filled by a painted leaf (Fig. 339), an arrangement resulting from the s same feeling, which later led the architects of the Augustan period to beset the said angles with rosettes, and also those of the middle ages to seek and find a similar transition between the square plinth and the circular base of the shaft. -- Instead of the lanceolate leaves on the bell decorated by acanthus leaves, there also occur broad water leaves, that are similarly transferred to the pier and ante capitals, as in Mylassa, for example.

The route followed by these forms of capitals -- with sedge and palm leaves -- passes from Egypt across Asia Minor to the Peleponnessus, these being the articles last imported!

Entire columns, half columns, isolated piers, antes and pilasters, are also afforded by this order, under the same assumption of a triple division into base, shaft and capital. For pilasters the shaft is chiefly plain, or as an innovation there occurs on them a border with sunken panel. (Hadrian's Gate and Monument of Philopappus in Athens, Doorway in Mylassa). Their capitals bear the form of the capital of the entire column, transformed to a flat surface.

As a beautiful example of an ante capital, whose forms were derived from the corresponding columnar capital, may serve the ante capital of Ancyra.(Fig. 341). The peculiar capital found near the Propyleion at Eleusis, at least still preserved in fragments, that perhaps once supported a tripod, may also be mentioned here. Winged lion-rams with lions' paws p project above the series of acanthus leaves at the angles of the capital, and they are connected by beautifully intertwined scroll ornaments; the recurved abacus,as on the columnar capitals, has a slight curve outward at the middle, that ends

in a slightly projecting flat.(Fig. 342 [1]).

*Note 1. See die Propyläen des Appius Claudius Pulcher in Eleusis from drawings of J. Durm in Zeits. f. Bauw. 1876. p. 437 et seq.; Pl. 63. Also Michaelis, A. Das sogenannte Dreifusskapitel von Eleusis. Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abth. Vol. 14. Athens. 1889. p. 9; lastly, Lenormaot, P. Antiquites d. Eleusis. Rev. gen. d'Arch. 1868. p. 101-8, Pls. 1, 2, 3. --- "The Dilettanti found the two ante capitals very much mutilated. We (i.e. Lenormant and his associates) have uncovered them anew, together with a well preserved capital of a column, which had escaped the English examination. -- The lower part is ornamented by a row of acanthus leaves, from which spring at the angles the forms of winged chimeras with lions' paws and heads, to which are added ram's horns. The heads of animals are wanting in the capitals published by the English architects and they have been made griffins." That in view of these facts and of the publication mentioned in Revue Generale d'Architecture and in Zeitschrift für Bauwesen, Michaelis always speaks of "griffins" remains singular.-- For supporting consecrated gifts, the capitals under consideration with their peculiar form of abacus could not have served, according to the researches of Michaelis, Dörpfeld and Kawerau,(See Michaelis, p. 10), while the contrary was assumed by Bötticher in his time.*

For columns of this order intended for supporting consecrated gifts, the form of capital experienced a change, in so f far as the abacus received a triangular shape instead of square for receiving the feet of the tripod. The sides of the abacus were then curved inward in a similar manner and the sh sharp angles were cut off.

On this idea is based the most beautiful of all tripod supports, the unfortunately much injured crowning marble finial of the Choragic monument of Lysicrates with its series of waterleaf, acanthus, and of the most magnificent volute scroll ornament, that has ever been created in art.

The acanthus is sharply cut on all Grecian monuments, the entire leaf being always divided into separate symmetrically arranged parts, which consist of a group of 3, 4 or 5 or more

balusters and pointed separate leaves, separated from each other by strongly projecting bands. The leaf arrangements appear in consistently carved lines; the aspect is easily recovered without heavily conducting the effect of being broken or wilted; whereas the full of life, it closely adheres to the form of the pail. An example from the Alexandrine period is given in Fig. 5e5 from the Temple of Artemis at Magnesia-s-M. (original in the former Pergamon Museum in Berlin), on which the leaf contra are made shorter and the lines are rounder.

The acanthus decorated in Fig. 5e4 was taken from a fragment found in Athens and illustrates the treatment of the different parts. A capital exhibited in the former Museum of the Acropolis in Athens shows the whole leaf and in at the same time an example of the degree of "realization", to which the magnificently inspired motive of the bell and volute capital had sunk.(Fig. 5e5).

Since the Corinthian bell capital was in the beginning intended as a basal motive for the Greek Corinthian, it should likely be mentioned, that the same likewise already occurs on Assyrian relief sculptures, although in a far more unsatisfain and indefinite form.(See the collection of Assyrian antiquities by G. Rawlinson).

The swelling of the columns is restricted in humans and is

Greatness between axes are equal, and on the Acropolis in Athens are 1m.3?4 ft., thus being about 0.107 m. greater than for the middle caesses of the Propylaion there. The architr-

6. The architrave is inverted from the Ionic, has a crown-line moulding like that, and its front surface is subdivided twice or thrice; the lowest bands were then frequently small and unimportant in comparison with the upper one (Pergamon). the face turned toward the wall is frequently lower than the front side, and the under surface is sometimes decorated by a narrow sunken panel.

There is no ornamentation on the fascias; but for example on the Choragic Monument of Lysicrates, these were painted for the decorative inscription.

delicate and pointed separate leaves, separated from each other by strongly projecting bands. The leaf extends upward in beautifully curved lines; its apex is gently recurved without thereby producing the effect of being broken or wilted; elastic and full of life, it closely adheres to the form of the bell. An example from the Alexandrine period is given in Fig. 343 from the Temple of Artemis at Magnesia-a-M. (original in the former Pergamon Museum in Berlin), on which the leaf points are made shorter and the pipes are rounder.

The acanthus represented in Fig. 344 was drawn from a fragment found in Athens and illustrates the treatment of the different parts. A capital exhibited in the former Museum of the Theseion in Athens shows the whole leaf and is at the same time an example of the degree of "ossification", to which the magnificently inspired motive of the bell and volute capital could sink.(Fig. 345).

Since the Egyptian bell capital was in the beginning introduced as a basal motive for the Greek Corinthian, it should finally be mentioned, that the same likewise already occurs on Assyrian relief sculptures, although in a far more uncertain and indefinite form.(See the collection of Assyrian capitals by G. Rawlinson).

The spacing of the columns is restricted in nowise and is just as free from restriction as for the Ionic order. The distances between axes are equal, and on the olympeion in Athens are 18.014 ft., thus being about 0.197 ft. greater than for the middle passage of the Propyleion there. The architrave block at the angle measures 21.494 ft. long.(Fig. 346).

d. The Architrave is imitated from the Ionic, has a crowning moulding like that, and its front surface is subdivided twice or thrice; the lowest bands were then frequently small and unimportant in comparison with the upper one (see Labranda); the face turned toward the cell wall is frequently lower than the front side, and the under surface is generally decorated by a narrow sunken panel.

There is no ornamentation on the fascias; but for example on the Choragic Monument of Lysicrates, these were utilized for the dedicatory inscription.

e. The friezes, as in the Ionic order, is plain or bears sculptures, but in either case it is from 1/2 to 1/3 lower than the architrave.(See Olympeion, monument of Lysicrates, [illegible]).

Plain flat bars of the Ionic friezes is likewise abundant, consists of an elastically carved frieze as already mentioned. At Ephesus it is swelled in a convex line, while in Baluchistan, Mylasa and Bobrans, the form of the bell of the capital is reversed. The carved friezes then generally remains plain or is rarely decorated by plant ornament, though vertical so-

Note 1. The same ornament is also found on the friezes of the Ionic Temple at Priene.(Late Ionic).

[illegible]

ric order, is treated as a fanti corniche (see Monument of [illegible]).

the dentils and the projecting cornice. These were relatively large horizontal projecting bean ends, as in the Erechtheion, subdivided into two parts in height, supported at top by an economy moulding, were plain bracketes as on the internal cornice of the Tower of Winds at Athens, or richly ornamented moulding, as on the Temple in Tegeans.(Fig. 147, See).

In many cases, all members of the main cornice, such as the projecting cornice, cyma and intermediate members, are covered over with sculptured ornaments, continuing and completing the richness of bases, capitals and friezes. The main cornice of the Choregi monument of Lysicrates received a very effective crowning ornament in the series of arched and connected, closely set antefixes, placed on the upper edge of the projecting cornice like a crown.

[illegible]

are indeed found on the inclined pediment cornices, begins from the pediments of the doorways of the Tower of Winds in Athens. There the dentils are also executed on the inclined pediment cornices in a manner hardly justifiable by antiquities. The pediments on prominent monuments are mostly destroyed and

e. The Frieze, as in the Ionic order, is plain or bears sculptures, but in either case it is from 1/2 to 1/3 lower than the architrave.(See Olympeion, monument of Lysicrates, Incantada in Salonichi, Labranda, Mylassa, Ephesus). But the plain flat form of the Ionic frieze is likewise abandoned, and the characteristic innovation is introduced instead, that consists of an elastically curved frieze as already mentioned. At Labranda it is swelled in a convex line, while in Salonichi, Mylassa and Ephesus, the form of the bell of the capital is repeated. The curved frieze then generally remains plain or is merely decorated by plant ornament, though vertical so-called pipes ornament the frieze of the Incantada.(Fig. 347) [1]

*Note 1. The same ornament is also found on the frieze of the Ionic Temple at Aizanoi.(Asia Minor).*

f. The Main Cornice is either taken unchanged from the Ionic order, is treated as a dentil cornice (see Monument of Lysicrates, Labranda in Fig. 348), or there occurs another characteristic innovation, the addition of modillions between the dentils and the projecting cornice. These were moderately large horizontal projecting beam ends, as on the Olympeion, subdivided into two parts in height, surrounded at top by an echinus moulding, were plain brackets as on the internal cornice of the Tower of Winds at Athens, or richly ornamented volute modillions, as on the Temple in Ephesus.(Figs. 347, 349).

In many cases, all members of the main cornice, such as the projecting cornice, cyma and intermediate members, are covered over with sculptured ornaments, continuing and completing the richness of bases, capitals and frieze. The main cornice of the Choragi Monument of Lysicrates received a very effective crowning ornament in the series of arched and connected, closely set antefixas, placed on the upper edge of the projecting cornice like a crown.

The same members as for the horizontal crowning cornice, a are indeed found on the inclined pediment cornice, judging from the pediments of the doorways of the Tower of Winds in Athens. There the dentils are also executed on the inclined pediment cornices in a manner hardly justifiable by esthetics. The pediments on prominent monuments are mostly destroyed and

[illegible] is not even found in Tegenaea.

h. The Tyrannion must have been distinguished by figure ornamentation, and its angles and ends by acroteria or finials, in accordance with the earlier motive of the Doric and Ionic orders.

i. Concerning the Ceiling and the Roof, although the monuments of this order belong to a later period, ten data relating to the ceiling and roof remain, like those of the other orders, scarcely anything existing for us. Merely the ceilings of small rectangular buildings yet remain, of the Tower of Winds and of the Choragic Monument of Lysicrates.

Mid novelties in assblatures, but nothing essential, are reported by the well known Tower of Winds, built about 100 B.C., with Korlosion of Antonines Overhanges in Ovals. The ceiling in the interior (Fig. 348) with volute consoles, nectared Acanths and Sanilla above it are developed illegically; [illegible] above which are arranged the not quite most beautiful Figure" reliefs representing the "winds", that are crowned by a [illegible] interesting, but its execution is weak. (See Division VIII: Fig. 488).

Quite absurd are the main cornices of the Sanctuary of Asklepios and of the Tyrannion at Pergamon. (Originals in the Pergamon Museum in Berlin; see the Pergamenmuseum in the great Pergamonwerke, V, 2, Pls. 12 and 8; p. 91, as well as Pls. [illegible]).

[illegible]

order is given by the adjacent representation of the Choragic to Monument in Athens, as it remained in the year 1829. (Fig. [illegible]).

[illegible]

market buildings, yet more ornamental after Hadrian porcelaneous, then as isolated sepulchral monuments. The detachment of the [illegible] form from its ornamental pedestal and its elevation to a real structural part, to be a free standing member, is here again announced, perhaps with a more correct feeling.

Low and wheel the convexities s and n of Pls. 488 were placed

are not even found in fragments.

h. The Tympanum must have been distinguished by figure ornamentation, and its angles and apex by acroterias or figures, in accordance with the earlier motive of the Doric and Ionic orders.

i. Concerning the Ceiling and the Roof, although the monuments of this order belong to a later period, few data relating to the ceiling and roof remain, like those of the other orders, scarcely anything existing for us. Merely the ceilings of small rectangular buildings yet remain, of the Tower of Winds and of the Choragic Monument of Lysicrates.

Wild novelties in entablatures, but nothing beautiful, are afforded by the well known Tower of Winds, built about 100 B. C., the Horologium of Andronicos Cyrrhestes in Syria. The cornice in the interior (Fig. 349) with volute consoles, coffered cornice and dentils above it are developed illogically; on the exterior the rising wall terminates in a dry architrave, above which are arranged the not quite most beautiful figure reliefs representing the "winds", that are crowned by a weakly treated main cornice. The idea of the upper ending remains interesting, but its execution is weak. (See Division XII; F Fig. 453).

Quite absurd are the main cornices of the Sanctuary of Athena and of the Trajaneum at Pergamon.(Originals in the Pergamon Museum in Berlin; see the representations in the great P Pergamonwerke, V, 2, Pls. 12 and 2; p. 31, as well as Figs. 350 a, b).

k. The view of a remaining structure of the Corinthian order is given by the adjacent representation of the Choragic Monument in Athens, as it remained in the year 1869.(Fig. 351).

This order likewise utilized the human figure on its monumental buildings, yet more ornamental after Egyptian prototypes, than as isolated actual supports. The detachment of the human form from its ornamental restraint and its elevation to a real structural part, to be a free statical member, is here again abandoned, perhaps with a more correct feeling.

How and where the caryatids a and b of Fig. 353 were placed

[illegible] be determined. They were in 1889 in the Istanbul museum in Athens. Assured is the position of the [illegible] figures on the Incantada at Thessalonica by the Turkish diagrams, but were still by the exhibition of the original works in the Louvre in Paris with the label:-- "Salonica, the sacred Thessalonica. Entablature and attic of the enchanted tal[illegible]

[illegible] twin capitals supporting the entablature are genuine; only a portion of the entablature is ancient, the remainder being restored. Four base slabs are likewise preserved. Although incomplete, the elevation is yet on the whole with a beautiful effect. (Fig. 374), and the drawings by Stuart and Revett. [illegible] (Ib. pls. 7, 9).

Figures attached to Corinthian pilaster, assumed in white marble at 1 1/2 times life size, were found in Corinth and are now exhibited in the museum there. (Figs. 372 A, C, a pensive supporter found in Illinois).

Crouching figures as supporters of stone slabs are preserved at the stage (proscenion) of the Theatre of Dionysos in Athens. (Fig. 373). The cast of a beautiful naked bearded [illegible]

[illegible] in Illinois.

Figures of terra cotta, conceived in naturalistic, are preserved in the Athens Museum and in the Berlin Museum, of the real [illegible] artistic execution. (Fig. 375 a).

can no longer be determined. They were in 1869 in the National Museum in Athens. Assured is the position of the removed figures on the Incantada at Thessalonica by the English drawings, but more still by the exhibition of the original works in the Louvre in Paris with the label:-- "Salonica, the ancient Thessalonica. Entablature and attic of the enchanted palace. Mission of E. Miller. 1864.(Fig. 354). The four Corinthian capitals supporting the entablature are genuine; only a portion of the entablature is ancient, the remainder being restored. Four base slabs are likewise preserved. Although incomplete, the elevation is yet on the whole with a beautiful effect.(Fig. 354, and the drawings by Stuart and Revett. Lief. 13, pls. 7, 8).

Figures attached to Corinthian piers, executed in white marble at 1 1/2 times life size, were found in Corinth and are now exhibited in the Museum there.(Figs. 352 A, C, a basket supporter found in Eleusis).

Crouching figures as supporters of stone slabs are preserved at the stage (proscenion) of the Theatre of Dionysos in Athens.(Fig. 355). The bust of a beautiful basket bearer ( (5.71 ft. high), whose former use is unknown, stands in the Museum at Eleusis.

Figures of terra cotta, conceived as caryatids, are preserved in the Athens Museum and in the Berlin Museum, of the most beautiful execution.(Fig 352 B).

Yet it was the realness of the monument closer for the a
veneration of a deity or of defeated mourners from the ex-
ulic period. (Altar of Zeus Soteros in the court of Pergamon
and of the Acropolis of Athens), shortly after the Germanic
of the first recorded years B.C.

"The careless and irreverent desire of the original period"
[illegible] to [illegible] memory was seldom a conscious one, [illegible]
the people, but it was never neglected in enclosed rooms, even
in the first period, after the erstwhile personal reverence of [illegible]

[illegible]

[illegible] that was approached with reverence. The deity later
[illegible] personal and was first covered in formless shapes, th-
[illegible] hand exhibited in certain places under the open sky, in
groves and sacred trees, at all times accessible to believers
[illegible] and for contact to the soul. In lines of the del-
[illegible] after the ancient custom.Pau-

[illegible]

[illegible] to be an [illegible], and the rarely venerated Deities in Ar-
[illegible] and [illegible] block, hollow [illegible] for [illegible]
[illegible]. The image of Poseidon Soteros stood in a great
[illegible], and the grievous figure of the Poseidon Artemis in the
[illegible] temple of an [illegible]. In Sparta two [illegible] cross [illegible]
[illegible] in [illegible], in Tyllene [illegible] a [illegible]
[illegible] image of the god in Aegeiae is "[illegible]

[illegible]

[illegible] material requires [illegible] from [illegible] master, a
[illegible] [illegible], we have seen for the image of [illegible]
[illegible]-like protective [illegible] supported [illegible] or [illegible]
[illegible] and most [illegible] [illegible] [illegible]
[illegible]. The [illegible] [illegible] [illegible] color of [illegible]

[illegible]

[illegible] [illegible], the [illegible] without [illegible] or the [illegible]
[illegible], perhaps the [illegible] of the later [illegible] [illegible], in-

[illegible] referred to the [illegible], the image of the deity and the

DIVISION VIII. RELIGIOUS MONUMENTS. (TEMPLES).

Slight are the vestiges of the monumental places for the v veneration of a deity or of relegious monuments from the heroic period,(Altar of Zeus Herkeios in the court of Tyrins a and on the Acropolis of Athens), shortly after the beginning of the first thousand years B.C.

"The nameless and impersonal deity of the principal period" required no house; worship was seldom a common one, uniting the people, and it was never performed in enclosed rooms,even in the best period, after the entire personal heaven of deities had been already created.

Trees, rocks, springs etc. were symbols of the deity, sacred places that one approached with reverence. The deity later became personal and was first revered in formless shapes, these being exhibited in certain places under the open sky, in caves and sacred trees, at all times accessible to believers for prayer and for comfort to the soul. An image of the deity, yet artless, an uncut stone after the ancient custom,Pausanias terms the idol later shown in the Temple of Hercules at Hyettus. He makes the primitive image of Eros at Thespia to be an uncut stone, and the highly venerated Charites in Orchomenos are rough stone blocks, fallen from heaven for Eteocles. The image of Artemis Cedreatis there stood in a great cedar, and the primeval figure of the Ephesian Artemis in the hollowed trunk of an elm. In Sparta two joined cross beams represented the Dioscures, in Cyllene was a standing phallus for Hermes; the image of the god in Amyclae is "ancient and artless and like a bronze column." -- Such images of perishable material required protection from wind and weather, a sheltered location, as we have seen for the images of Artemis; canopy-like protecting roofs supported by piers or columns, the simplest and most natural arrangements afforded the same protection. The archaic sacred wooden column of Oenomaos was protected by a roof supported by four columns; the roof borne by wooden posts, the sanctuary without walls on the market at Elis, perhaps the prototype of the later columnar Temple, indeed served for similar purposes. An increased protection was afforded to the sanctuary, the image of the deity and the

[illegible] tions, or the memory cells, that received the first [illegible] great [illegible]. -- To develop these architectural ideas and to [illegible] them into monumental expression was reserved to the succeeding period.

[illegible] seems to procedure in the reduces of the time's esthetic [illegible]

of the Gods as bases of the deity:-- the dwelling of the [illegible] man, not of a [illegible] man, much in like the home of the deity on earth. Proceeding from this anthropomorphic idea, there was [illegible] developed the temple structure of the historic period, according from the case of the preceding one without [illegible]. "The [illegible], the [illegible] and the [illegible] would have been no temple architecture, the worship without an image required no permanent habitation." [1] The medium was observed [illegible], was approached by column on two or on all four sides, and the whole was placed on a [illegible] structure. [illegible]

[illegible]

In these buildings invested in the veneration of the deities is found the climax of the artistically most important architecture of every people, both in the design of architecture, as well as those of sculpture and painting; the artistic idea is therefore most spiritually worked out and expressed, the expression of form is the most perfect. Therefore [illegible] is to be studied.

As already stated and will again be shown, [illegible] on the studies of oriental art (Egypt, [illegible]) [illegible] resemblances of the first people introduced the [illegible] Indian family. Thus the most ancient temples of India (Elephanta in Salsette) exhibit the much elongated form of [illegible], longitudinally divided into three [illegible], the [illegible] [illegible] surrounded by additional rooms, or is solely [illegible] the form of [illegible]. (Fig. [illegible]). The porticos, which sur-

consecrated gifts by the enclosure of the place for exhibiting these, by the masonry cell, that received its light through a great doorway. -- To develop these architectural ideas and to bring them into monumental expression was reserved to the succeeding period.

Others desire to recognize in the Megaron of the king's palace (Tiryns, Troy, Cnossos, Phaestos, Mycenae) the prototype of the Grecian house of the deity;-- the dwelling of the prince, not of a common man, should be like the home of the deity on earth. Proceeding from this aristocratic idea, there was gradually developed the temple structure of the historic period, appearing from the haze of the preceding one without monuments. "The premycenaean, the Mycenaean and the Homeric world knew no temple architecture, the worship without an image required no permanent habitation." [1] The megaron was characterized externally, was surrounded by columns on two or on all four sides, and the whole was placed on a stepped structure.

*Note 1. See R. Borrmann and J. Neuwirth. Geschichte der Architektur. p. 102. Leipzig. 1904. Especially Perrot & Chipiez. Histoire de l'Art dans l'Antiquite. VII. p. 350 et seq.*

In these buildings devoted to the veneration of the deities is found the climax of the artistically most important undertakings of every people, both in the domain of architecture, as well as those of sculpture and painting; the artistic idea is thereon most spiritedly worked out and expressed, the expression of form is the most perfect. Therefore in them will the system of Grecian architecture be chiefly developed and is to be studied.

As already stated and will again be shown, Grecian art stands on the shoulders of oriental art (Egyptian and Asiatic). Reminiscences of the East reecho throughout the plan of the Grecian temple. Thus the most ancient temples of Sicily (4 temples in Selinus) exhibit the much elongated form of cell, longitudinally divided into three apartments, the vestibule, the holy place and the most holy place, as in the Asian temples of the deity; excepting that the most sacred place is not surrounded by additional rooms, or is wholly withdrawn from the view of believers. (Fig. 356). The porticos, which sur-

surrounded the courts, are now directly attached to the temple, that forms a great protecting roof supported by columns, a m monumental canopy,"the most ancient symbol of terrestrial and celestial supremacy," which extends uniformly over the portico, the cell,and the statue of the deity.

The oldest temples, whose mode of construction is not stated by Pausanias, nor whether they were Doric or Ionic, were indeed not very different from the usual dwellings of men, w whose good and bad peculiarities, manners and customs, hates and loves, continued with the gods, who had become personal. The walls of these buildings were constructed in the simplest manner, and only one end wall contained the great entrance d doorway, extending almost to the ceiling, which from this ratio of dimensions, must have had a purpose other than that of admitting visitors, for which smaller dimensions would have sufficed. (Compare the doorways of the Gothic cathedral with reference to the capacity of the interior, remembering that in this case, the sanctuary must accommodate numerous worshipers).

Besides the closed vestibule also occurs the open one. Antes then terminate the side walls, which retain their original extent; the transverse wall and its doorway are replaced by columns, the principal entrance doorway then being placed in the division wall, which formerly enclosed the sacred place. (Fig. 355). In another change of the plan, the third division of the cell, or the most sacred place disappears, giving place to an open rear portico. The statue of the deitn retains its position in the cell enlarged in this manner; the personal deity becomes nearer to man. (Compare the "heseion).

In certain cases as for example in the Parthenon, there was also added another apartment accessible from the rear, and which must have served as the treasury of the state, under the guardianship of the deity. The formerly unbroken interior was then divided by colonnades placed in it, one above the other and separated by a simple architrave, i.e., the cell w was divided into two narrow side aisles and a broad central aisle. The interior became in a manner two-storied, and small stairways gave access to the different divisions in the height (Fig. 357).

[illegible] to the [illegible]. [illegible]
concerned, the side walls of the front and rear porticoes recede, then concentrated but slightly beyond the walls constituting the doors, the earlier wall and doorway is recessed by antae and columns and is changed into a complete colonnade. (Compare the Erechtheion). A still more important enlargement of the well tiredly led to the pseudodipteral temple, to a plan like that of the Temple of Zeus in Akragas.

Either in the most ancient monuments, nor in those of the next period, is the colonnade anywhere dependent on the cella; the antae do not range with those of the pronaos or opisthodomos; the cellae beam accentuating thereto are arranged just as independently without reference to walls or columns of the stone temples.

The new idea, which is always expressed in the structure of the Greeks temple and is in connection to its oriental kindred, [illegible] on an elevated substructure. Rather dry in comparison to [illegible]

the beginning of the last century; the house there has in the round also the form of an elongated rectangle, and it exhibits the sure enclosing row of columns or piers on a slightly raised platform, to which a narrow flight of steps leads.

[illegible]
Pulpiem. I. p. 402, 402. This form of temple concerned under the 12 th dynasty, but it was also still retained in the Ptolemaic period.

The form of decident facade with antae and columns, which Vitruvius considers to consider as the most ancient type, and which was the model in the tomb chapels of Asia Minor and in the Egyptian grotto tomb of Deir Bahasan, could not have alone adhered to the temple, as shown by Semper, and also further proved by the treasuries in Olympia, where Doric have facades with antae and columns.[2]

Note 2. Therefore others also allow the Greeks temple to have originated from the treasury.

and to the attic.(Compare Akragas). In a further state of p progress, the side walls of the front and rear porticos recede, then projecting but slightly beyond the walls containing the doors, the earlier wall and doorway is replaced by antes and columns and is changed into a complete colonnade. (Compare the Parthenon). A still more important enlargement of the cell finally led to the pseudodipteral temple, to a plan like that of the Temple of Zeus in Akragas.

Neither in the most ancient monuments, nor in those of the best period, is the colonnade anywhere dependent on the cell; the antes do not range with those of columns the pronaos or opisthodome; the ceiling beams appertaining thereto are arranged just as independently without reference to walls or columns of the stone temples.

The new idea, which is always expressed in the structure of the Grecian temple and is in opposition to its oriental kindred, is that of a sacred cell surrounded by columns and standing on an elevated substructure. Rather dry in comparison to the Hellenic, this form of temple is also found in Egypt, for example, in the little Temple at Elephantine,[1] vanished since the beginning of the last century; the house there has in the ground plan the form of an elongated rectangle, and it exhibits the same enclosing row of columns or piers on a slightly raised platform, to which a narrow flight of steps leads.

*Note 1. See its description and illustrations in Perrot & Chipiez. I. p. 402, 403. This form of temple appeared under the 18 th dynasty, but it was also still retained in the Ptolemaic period.*

The form of pediment facade with antes and columns, which Vitruvius prefers to consider as the most ancient type, and which has its motive in the tomb facades of Asia Minor and in the Egyptian grotto tomb of Beni Hassan, could not have alone belonged to the temple, as shown by Semper, and also further proved by the treasuries in Olympia, which mostly have facades with antes and columns.[2]

*Note 2. Therefore others also allow the Grecian temple to have originated from the treasury.*

The sanctuaries of the Greeks stand in isolation on steep

neiths (Assos, Selinus), or are surrounded by a sacred wood, are placed on a noble terraced structure, or lodges in the lower portion of the city (Thesseion, Olympeion), or they are frequently grouped on a strictly limited area (Athens, Sparta, Olympia, Argeas): they are often placed in consecrated precincts surrounded by strong walls, access to them being or-

[illegible]

and are also surrounded by protecting porticos, treasuries, gifts, etc., often affording security in troublous times to the unmanlike portion of the people and to its treasures. (Fig. 383: elevation of the Temple at Assos).

The temple should produce an effect more by its form than by its masses; I here except the pilgrimage temples, the Asclepieion at Epidaus, and the two erganic sanctuaries dedicated to Zeus Olympios at Selinus and Akragas, "exalted within and quietly beautiful." They are therefore usually of moderate dimensions, and the cell was almost always accessible to the people, though not intended for the assemblage of a tremendous multitude.

In the Temple of the birth goddess Eileithya on the Cronion Hill at Olympia, any one could enter the front apartment of the double temple, though priestesses alone entered the inner [illegible]e.

The Temple of Aphrodite in Sykion was only accessible to the female temple servants and to a certain maiden; all others only beheld the goddess and prayed to her from the entrance.

In a double Temple of Asklepios there, admission to the second cert was only permitted to the priests etc.[illegible]

[illegible]

Thus for example, the cellar e temple at Selinus has a width of 24.36 ft. with a length of 34.74 ft.; the centre aisle of the Heraion at Olympia is 21.54 ft. long and but 12.47 ft. [illegible]

[illegible]

is 54.03 ft. by 21.54 ft. In the last case, only one-third of the cell was used by the people, since the numerous outbuildings were occupied by the altars of the Horay and the tables for offerings. A space for the "people" thus remained there about 71.54 ft. by 21.17 ft., or of 3[illegible] sq. ft. In round num-

heights (Assos, Egina), or are surrounded by a sacred wood, are placed on a noble terraced structure, or located in the lower portion of the city (Theseion, Olympeion), or they are frequently grouped on a strictly limited area (Athens, Selinus, Olympia, Akragas); they are often placed in consecrated precincts surrounded by strong walls, acces to them being obtained through magnificent portals with porticos, propyleions, and are also surrounded by protecting porticos, treasuries, gifts, etc., often affording security in troublous times to the unwarlike portion of the people and to its treasures. (Fig. 358; elevation of the Temple at Assos).

The temple should produce an effect more by its form than by its masses; I here except the pilgrimage temples, the Artemesion at Ephesus, and the two gigantic structures dedicated to Zeus Olympios at Selinus and Akragas, "exalted within and quietly beautiful." They are therefore usually of moderate dimensions, and the cell was almost always accessible to the people, though not intended for the assemblage of a devout multitude.

In the Temple of the birth goddess Eileithya on the Cronion hill at Olympia, any one could enter the front apartment of the double temple, though priestesses alone entered the inner one.

The Temple of Aphrodite in Sykion was only accessible to t the female temple servants and to a certain maiden; all others only beheld the goddess and prayed to her from the entrance.

In a double Temple of Asklepios there, admission to the second part was only permitted to the priests etc. [3]

*Note 3. See Pausanias. VI. (Elis, second part). 20, 25.*

Thus for example, the cellsof a temple at Selinus has a width of 24.98 ft. with a length of 89.04 ft.; the centre aisle of the Heraion at Olympia is 91.34 ft. long and but 12.47 ft. wide; the centre aisle of the Temple of Zeus at the same place is 94.00 ft. by 21.89 ft. In the last case, only one-third of the cell was used by the people, since the remaining two-thirds were occupied by the statue of the deity and the tables for garlands. A space for the "people" thus remained there about 21.34 ft. by 31.17 ft., or of 667 sq. ft. in round num-

The centre aisle of the temple measures:--

Temple on Selinus 10.72 × 12.70 ft. = 136.68 sq. ft.

Temple in Phigaleia 14.47 × 41.99 ft. = 608.05 sq. ft.

Temple Parthenon 32.41 × 98.98 ft. = 3208.30 sq. ft.

Let us therefore omit the "people"and the festal processions from the temple, assuming it to have been only entered by individuals, and principally by priests alone, who offered bloodless sacrifices on the small altars before the statue of the deity, while the festal processions were left to the "festal altar" before the Temple, assuming with Dorpfeld.

"A festival procession in Ithome, that interesting reminiscence of one "a noble and richly decorated apparent for the deity, but observer on the whole before his entrance".

In Olympia the Pelopion of the Pelopes was a small mound, the sacrificial altar of the Pelopes was 4.20 ft. high, 4.20 ft. long, 4.20 ft. wide, and the Pelopion was a relatively virgin sanctuary, bound and entirely surrounded, rose the cell surrounded by columns covered by architrave, in accordance with the high column of surrounding nature. The three colossal temples in Selinus, Phigaleia and Bi-

According to the evidence of the ritual, as explained,

numbers, a superficial area corresponding to that of a large living room in a modern house.

The centre aisle of the temple measures:--

Temple on Egina 10.73 × 12.60 ft. = 449.96 sq. ft.

Temple in Phigaleia 14.47 × 41.99 ft. = 522.05 sq. ft.

Temple Parthenon 32.41 × 33.93 ft. = 2722.20 sq. ft.

In these cases likewise, if two-thirds is reserved for the statue of the deity and the altar, there remains for the "people" at Egina and Phigaleia the small areas of 150.70 and 1 172.22 sq. ft., and in the Parthenon 914.95 sq. ft., or rather more than at Olympia. "Great festal processions" could not occur in these interiors, especially if the space occupied by the numerous gifts were also deducted!

Let us therefore omit the "people"and the festal processions from the temple, assuming it to have been only entered by individuals, and principally by priests alone, who offered bloodless sacrifices on the small altars before the statue of the deity, while the burnt offering occurred on the great altar before the temple,(In accordance with Asian usage).

As strikingly described by Vischer, the interior is therefore "a noble and richly decorated apartment for the deity, intended to be seen, the vestibule concentrating the mind of the observer on the whole before his entrance".

In accordance with the dimensions of the ground plan, the measurements of the height of the temple are unimportant. The Temple on Egina measured 34.73 ft. high to the apex of the pediment, that in Phigaleia 35.76 ft., and the Parthenon 32.66 ft. On a repeatedly divided substructure, broad and quietly coursed, rose the cell surrounded by columns spanned by architraves, succeded by the frieze and the croyning principal cornice, the structure receiving its final and expressive ornamentation by the gently inclined pediments decorated by figures. The exterior of the temple shone with rich gilding and with brilliant decorations in color, heightened by metallic accessories, in accordance with the high colors of surrounding nature. The three colossal temples in Selinus, Akragas and Miletus are particular undertakings outside the normal scheme.

According to the evidence of the writers, to traditions, and

as those in the inscriptions. Later you do sometimes find the [illegible] lation methods of construction for religious buildings, with preference to the materials employed.

I. Temple constructed of wood, with the use of [illegible] their substructures, walls of unburned bricks, with wooden columns or pier-like posts. Here are [illegible] accounts:—

1. The first temple at Delphi, that according to Pausanias was built in the earliest period of laurel wood, [illegible] of the laurel in Tempe. Therefore this temple [illegible] the form of a hut.

2. The second temple there was constructed by bees of their wax and feathers, really by a Delphian named "Pteras". The story that the temple was made of beeswax brought by the bees, [illegible] believed by Pausanias himself.

3. The third temple was of bronze, i.e., its woodwork was covered by bronze plates. [illegible] already built of bronze a roof for his daughter, and there still exists in Lacedaemon the Temple of Athena Chalkioikos, [illegible] by Plutarch. The [illegible] was [illegible] with a bronze ceiling, by which is meant that the [illegible] and [illegible] on Il. [illegible].

4. The fourth temple was first built of stone by Trophonios and Agamedes, but it burned down [illegible].

5. The present temple in Delphi was erected by the [illegible] to the oracle with the secret treasures; it was decorated by sculptures of Antenor — of archaic [illegible] marble.

Certainly a [illegible] from the most [illegible] the remaining best monument in [illegible]!

1. The Temple of Apollo Epikurios (Phigalia, [illegible]. Pausanias VIII. 41), an [illegible] from Iktinos, and only known [illegible] — as he expresses it. It was erected [illegible] and [illegible]. About [illegible] a few temple [illegible] of one building [illegible] [illegible] a kind of [illegible] in small [illegible] [illegible] in a [illegible].

to finds in the localities, there may be established the following methods of construction for religious buildings, with reference to the materials employed.

I. Those constructed of wood, with the use of cut or split stone substructures, walls of sundried bricks, with clay terraces or clay tile roofs. Here are to be counted:--

a. The first Temple at Delphi, that according to Pausanias, was built in the earliest period of laurel wood, from branches of the laurel in Tempe. Therefore this sanctuary had the form of a hut.

b. The second Temple there was constructed by bees from t their wax and feathers, really by a Delphian named "Pteras". The fable that the temple was made of herbage growing on the hills, the still green plants being woven together, was not believed by Pausanias himself.

c. The third Temple was of bronze, i.e., the woodwork was covered by bronze plates. Acrisius indeed had already built of bronze a room for his daughter, and there still stands in Lacedemon the Temple of "Athene Chalkiokos", which is also attested by Plutarch. The Forum in Rome was further furnished with a bronze covering, by which is indeed meant the temples and basilica on it.(648-645 B.C.).

d. The fourth Temple was first built of stone by Trophonios and Agamedes, but it burned down again.

e. The present Temple in Delphi was erected by the Amphictyons to the deity with the sacred treasures; it was constructed by Spintharos of Corinth -- of ordinary limestone and marble.

Certainly a notable sequence from the most perishable to t the material most monumental in execution!

f. The Temple of Poseidon Hippios (Pausanias. VIII. Arcadia. 10), six stadias distant from Mantinea, was only known to Pausanias by hearsay -- as he expresses it. It was framed f from oak beams by Agamedes and Trophonios. About this Hadrian had a new temple building constructed. We learn nothing of any definite style; the structure indeed must have been merely a kind of blockhouse in small dimensions, which Hadrian enclosed in a stone temple.(Perhaps an arrangement simi-

similar to the Cere Santa in Lorete or that in S. Maria Zeali
unpeli near Assisi -- the Fortinguia.

8. concerning the Heroion built 15 stadias from Mycenae,
Pausanias says (II, Corinthiaca, 15), after he described the
stone Temple there and referred to the consecrated altar in
the vestibule and the chryselephantine statue of Juno in the
Temple:-- "If one goes beyond this Temple, he finds the foun-
dations of the earlier Temple, and something left by the Ila-
ros. It burned by the fault of the priestess Chrysis, who
was asleep, when the lamp burned down and the flame seized on
the wreath. But in spite of the great misfortune, her statue
was left standing before the burned temple as one of the con-
secrated." This must refer to a fire in the interior, but
which caught on and destroyed the ceiling and roof, when the
furniture of the temple was in flames.

In Argolis, Baedeker states:-- "On the highest terrace, above
the far visible Cyclopean wall, stood the ancient Temple; th-
ere is still preserved but a part of the ancient masonry of
the stylobate with the sites of three columns".

to us by the American Archaeological Institute at Athens.
the place was covered by a burnedd mass, that he found the
.99 ft. and a distance between centres of 11.49 and of 11.31
ft., concluding from this, that columns and entablature were
certainly of wood, basing this opinion upon the small diamet-
er and wide spacing of the columns ("as indicated by the small
diameter and wide spacing of the columns"), wherefore he furth-
er concludes, that beneath the stylobate was no foundation,
found, and that all stone architecture was wanting. "Those
were not burned into lime, the charcoal remains would be sat-
isfactorily fumished by the wooden ceiling of the outer corri-
do and of the cell, as well as by the woodwork of the build-
ing, on which I remark, that the column diameter of 2.62 ft.

similar to the Casa Santa in Loreto or that in S. Maria degli Angeli near Assizi -- the Portiuncula.

g. concerning the Heraion built 15 stadias from Mycenae, Pausanias says (II. Corinthiaca. 15), after he described the stone Temple there and referred to the consecrated gifts in the vestibule and the chryselephantine statue of Juno in the Temple:-- "If one goes beyond this Temple, he finds the foundations of the earlier Temple, and something left by the flames. It burned by the fault of the priestess Chryseis, who was asleep, when the lamp burned down and the flame seized on the wreth. But in spite of the great misfortune, her statue was left standing pefore the burned temple as one of the consecrated." This must refer to a fire in the interior, but which caught on and destroyed the ceiling and roof, when the furniture of the temple was in flames.

Concerning the present condition of this national sanctuary in Argolis, Baedeker states:-- "On the highest terrace, above the far visible Cyclopean wall, stood the ancient Temple; there is still preserved but a part of the ancient masonry of the stylobate with the sites of three columns".

A comprehensive, thorough and fine representation is given to us by the American Archaeological Institute at Athens. [1] The editor therein remarks (p. 110), that before excavation the place was covered by a hardened mass, that he found the marks of the locations of 3 columns, which had a diameter of 2.82 ft. and a distance between centres of 11.48 and of 11.51 ft., concluding from this, that columns and entablature were certainly of wood, basing this opinion upon the small diameter and wide spacing of the columns ("as indicated by the small diameter and wide spacing of the columns"), whereon he further concludes, that beneath the stylobate was no foundation, that only remains of charcoal and burnt fragments of wood were found, and that all stone architecture was wanting. Stones might indeed again be used for the new temple, so far as they were not burned into lime, the charcoal remains would be sufficiently furnished by the wooden ceiling of the outer portico and of the cell, as well as by the woodwork of the building, on which I remark, that the column diameter of 2.62 ft.

be not small and the distance between centres of columns as 11.65 ft. is large, especially when wooden beams are assumed. The store arrangements for the temples in Eleusis, Knossos, Ma-lia, on the Great Temple in Komasti, and in Pasatum measure: 10.70, 10.90, 10.14 to 12.94, 14.89, and even the greatest a-re not less!

Note 1. Antiquities 14. Ionic Temples. "Ionia".

2nd Rev York, 1908. American School of Classical Studies at Athens. Archaeological Institute of America. I. p. 110 et seq.

Note 2. Ionic Temples in Asia Minor.

about 29.52 ft. height for a mean diameter of 2.98 ft.; those 5.10 to 5.47 ft.: those on the oldest temple in Metapontum having a lower diameter of 3.92 ft.: the columns on the earli-est temple at Ferasmon even one of 1.77 ft. Thus even the wide spacing and slenderness of the columns does not prove a mod-ern architrave, and if no stone remains longer exist, this Re-

Note 3. Ionic Temples.

naps the cell walls in Greece built of sun-dried bricks, since they have been disappeared?

b. Of the Temple of Apollo at Thermos, "that formed the cen-tre of Aeolic civilization and strength", there is also cer-tainly the sapire, that it was first an ancient structure of wood, that was transformed into a stone temple. The terra cotta ridges found near it with painting with black figures, which indicate the 6 th century B.C., the terra cotta brick tiles a-nd cones of the 5 th and 6 th centuries only denote frequent repairs, and the distance between the axes of columns of 5.12 to 5.32 ft. as well as the diameters of the columns from 3.30 to 3.48 ft. tell in what is said under a.

Note 3. Ionic Temples. p. 57. Athens. 1909. Ilias Kalamaris

Note 4. Ionic Temples.

Note. Alterthum. I. Reviewed by A. Michaelis. p. 198. Leipzig. 1890.

The said Temple of Apollo at Thermos, according to Antike Denkmäler, (1. 3-1904), was undertaken by G. Sauritzes and G. Karagiorgis to a more thorough examination and was completely re-presented in text and illustrations.

is not small and the distance between centres of columns at 11.48 ft. is large, especially when wooden beams are assumed. The stone architraves for the temples in Egesta, Akragas, Selinus, on the Greek Temple in Pompeii, and in Paestum measure: 13.78, 15.09, 12.14 to 13.94, 14.69, and even the greatest a are not long!

*Note 1. Waldstein, Ch. The Argive Heraeum. 2 vols. Boston and New York. 1902. American School of Classical Studies at Athens. Archaeological Institute of America. I. p. 110 et seq.*

The marble columns on the Mausoleum in Halicarnassus have about 29.52 ft. height for a mean diameter of 2.72 ft.; those on the propyleion of the Megaron of Demeter near Selinus are 2.10 to 2.47 ft.; those on the oldest temple in Metapontum having a lower diameter of 3.23 ft.; the columns on the market Temple at Pergamon even one of 1.97 ft. Thus even the wide spacing and slenderness of the columns does not prove a wooden architrave, and if no stone remains longer exist, this Heraion shares the fate of so many other monuments. Were perhaps the cell walls in Egesta built of airdried bricks, since they have now disappeared?

h. Of the Temple of Apollo at Thermos, "that formed the centre of Aeolic civilization and strength", there is also current the saying, that it was first an ancient structure of wood, that was transformed into a stone temple. [2] The terra cotta metopes found near it with paintings with black figures, which indicate the 6 th century B.C., the terra cotta drip tiles a and cymas of the 5 th and 6 th centuries only denote frequent repairs, and the distance between the axes of columns of 3.10 to 3.86 ft. as well as the diameters of the columns from 2.30 to 2.46 ft. fall in what is said under g.

*Note 2. See Praktika. p. 57. Athens. 1899. Then Ephemeris 1890. p. 161. Also Anton Springer. Handbuch der Kunstgeschichte. Altertum. I. Revised by A. Michaelis. p. 126. Leipzig. 1904.*

The said Temple of Apollo at Thermos, according to Antike Denkmäler, (1902-1908), was subjected by G. Satiriades and G. Kawerau to a more thorough examination and was completely represented in text and illustrations.

Fourteen stone sphinxes, that an earlier temple existed from the 4 th to the 3 rd century B.C.) from which abundant terra cotta materials, but not the smallest fragment of a stone entablature, from which it may be assumed, that only wooden entablature, coming out roof, with a back walling or strutted panels as the materials, that could technically be combined with a wooden entablature, came into use for the cuillins. Tiles are split spaces combine with wood just as well or as badly. Where works then be the entire mediaeval and modern well timber construction?

There were found pieces of painted and strongly undercut tile tiles, the arrangements for fastening them not being recognizable. These terra cotta cornices are not exactly to be termed usually "large", since they do not exceed the dimensions of the crossed Roman tile of 1.27 ft., or attain those of the roof tile from the palace of Artaxerxes (Louvre fragm) of 1.77 × 2.65 ft. and those of many Etruscan tiles. On the contrary, the height of the face of 1.64 ft. is to be recognized. The cymas with a double round are likewise 1.64 human pieces.(Alatri). On the basis of this material, Kawerau [illegible] ways have been chased". Their lowest drops of stone are assumed! Their diameter is 2.10 ft., from which the width of the architrave may be taken as 1.56 ft. Kawerau concludes the architrave of two wooden beams lying side by side,"in order to not require impossible dimensions of timbers", and indeed [illegible]

[illegible] sovereign, from which rose the structure of the frieze and cornice. Their form remains unknown. The terra cotta metopes are preserved in several entire pieces. Every slab shows on the upper side two moulded projections, that indeed served for fastening on an upper longitudinal wooden stave. That must indeed be assumed. The painted field is surrounded by a stripe of a single color. The terra cotta tralypons were not found on the temple. Were they therefore of wood? Yet in Thermos at other places were found the terra cotta trae-

Kawerau states thereon, that an earlier temple existed from the 6 th to the 3 d century B.C.1 from which abundant terra cotta materials, but not the smallest fragment of a stone entablature, from which it may be assumed, that only wooden entablature, ceiling and roof, with a back walling of airdried bricks as the materials, that could technically be combined with a wooden entablature, came into use for the building. Bricks and split stones combine with wood just as well or as badly. Where would then be our entire mediaeval and modern half timber construction?

There were found pieces of painted and strongly undercut drip tiles, the arrangements for fastening them not being recognizable. These terra cotta cornices are not exactly to be termed unusually "large", since they do not exceed the dimensions of the bipedal Roman tile of 1.97 ft., or attain those of the roof tile from the Palace of Artaxerxes (Louvre Museum) of 1.77 × 2.66 ft. and those of many Etruscan tiles. On the contrary, the height of the face of 0.64 ft. is to be recognized. The cymas with a double round are likewise 0.64 ft. high and are perforated at top, like similar Etruscan and Roman pieces.(Alatri). On the basis of this material, Kawerau assumes a wooden architrave"on columns, just as these may always have been shaped". Their lowest drums of stone are assumed! Their diameter is 2.13 ft., from which the width of the architrave may be taken at 1.34 ft. Kawerau constructs the architrave of two wooden beams lying side by side,"in order to not require improbable dimensions of timbers", and indeed with right, since Vitruvius also prescribes this.

On the two beams must then necessarily be fixed a protecting covering, from which rose the structure of the frieze and cornice. Their form remains unknown. The terra cotta metopes are preserved in several entire pieces. Every slab shows on the upper side two moulded projections, that indeed served f for fastening on an upper longitudinal wooden strip. That must iddeed be assumed. The painted field is surrounded by a stripe of a single color. The terra cotta triglyphs were not found on the temple. Were they therefore of wood? Yet in Thermos at other places were found the terra cotta trig-

triglyphs of a small archaic building. Until Kawerau leaves the question open, whether wooden or terra cotta triglyphs were employed on the temple. The axial distance at the temple is [illegible] ft. and the triglyphs as 1.76 ft. wide. Kawerau assumes the woodwork to be protected by painting, since the terra cotta covering plates were not found. Terra cotta box coverings, like those used in Sicily and Lower Italy, could not be proven. When it is either stated, that such box pieces were determined only as coverings for stone cornices, then the author does not know of the pieces from Metapontum with the long copper nails (formerly in the Museum at Metapontum; on questioning, it was said to us, that the nails are now in the Naples Museum, were transferred to the prehistoric collection and are not now (1907) exhibited.

With the Vitruvian theory of origin, the frieze [illegible] of the ends of transverse beams; for the free length of the ceiling beams outside and inside the cell is but [illegible] ft., and there were not required beams [illegible] ft. high, as assumed for the metopes. Yet for a restoration, I would make the ceiling beams stronger and placed higher, adding wooden posts between the architrave and the ceiling beams, and also would limit the use of sundried bricks to filling the spaces between the beams.

I give great credit to Mr. Kawerau, that he has proceeded so technically in the explanation of the finds, and that his assumptions have been made with as much foresight as possible, free from all preconceptions, and that he has spared us Doric wooden columns, like those of Evans.

(See the very interesting and beautifully represented section through the substructure by G. Kawerau, a reproduction of which is given in Fig. [illegible], after plate [illegible] of his work.[1])

Note 1. This publication was the last gift made to me by him before his death, for which I could no longer thank him. Let the figure be dedicated to his memory.

But it should not be said, that before the stone temple, a

triglyphs of a small archaic building. Still Kawerau leaves the question open, whether wooden or terra cotta triglyphs were employed on the temple. The axial distance at the temple is 3.77 ft., from which the metopes are computed to be 2.62 ft. and the triglyphs at 1.76 ft. wide. Kawerau assumes the woodwork to be protected by painting, since the terra cotta covering plates were not found. Terra cotta box coverings, like those used in Sicily and lower Italy, could not be proved. When it is either stated, that such box pieces were determined only as coverings for stone cornices, then the author does not know of the pieces from Metapontum with the long copper nails.(Formerly in the Museum at Metapontum; on questioning, it was said to me, that the nails are now in the Naples Museum, were transferred to the prehistoric collection and are n not now (1907) exhibited.

With the Vitruvian theory of origin, the frieze of this old stone-wood-terra-cotta temple also has nothing to do. The t triglyphs in the present case cannot be regarded as the coverings of the ends of transverse beams; for the free length of the ceiling beams outside and inside the cell is but 6.56 ft., and there were not required beams 2.95 ft. high, as assumed for the metopes. Yet for a restoration, I would make the ceiling beams stronger and placed higher, adding wooden posts between the architrave and the ceiling beams, and also would limit the use of airdried bricks to filling the spaces between the beams.

I give great credit to Mr. Kawerau, that he has proceeded so technically in the explanation of the finds, and that his assumptions have been made with as much foresight as possible, free from all preconceptions, and that he has spared us Doric wooden columns, like those of Evans.

(See the very interesting and beautifully represented section through the entablature by G. Kawerau, a reproduction of which is given in Fig. 359, after plate 49 of his work.[1] )

*Note 1. This publication was the last gift made to me by him before his death, for which I could no longer thank him. Let the figure be dedicated to his memory.*

But it should not be said, that before the stone temple, a

temple did not stand here on the site, [illegible]
of the stone structure.

i. In the oldest Ionic Temple at Doric O, Probable remarks:
[illegible]
[illegible] of wooden columns or of wooden coverings of the parastas-
des. [illegible]
[illegible] remains of the stone columns of the second (later) temple
[illegible] the basis of the axial distances found. The stylobates of t
[illegible] are of limestone. Of the older and smaller temple, ab
[illegible] building of the second, there was only removed west fail
[illegible] one-sided (or parastasis), only receiving a certain
[illegible] later. For covering it may have served some pie-
ces of painted tiles with archaic ornaments found in the pro-
[illegible] of the temple. The stylobate step has a width of 2.[illegible]
[illegible], and an average diameter of [illegible] m. [illegible]
[illegible] be assumed with an axial distance of 12.80 m. The sit-
[illegible] of the column and distance between centres agree alm[illegible]
[illegible] with those of the Archaic Parthenon.

After one recognizes the position of both temples with reg-
ard to each other, and if one considers the resulting coord-
inates as the building of the second temple, he will scarcely
[illegible] the columns and their axial distances, nothing will be con-
ved.

k. Because elevated to the system, the Ionion at Olympia
[illegible] requires consideration. It is said of this, that
"through Dörpfeld's thorough treatment it has become the clas-
sical building for the knowledge of the origin of the Doric
style." It is permitted to any one to believe that. But it
[illegible] be definitely assumed, that the cell [illegible]
[illegible]
[illegible] of wood, but originally the colonnade [illegible]

temple did not stand here on the site, yet the latter certainly had nothing in the least to do with the plan and treatment of the stone structure.

i. On the oldest Ionic Temple at Locri O. Puchstein remarks:[2] "Lastly in opposition to Petersen, we could recognize no vestiges of wooden columns or of wooden coverings of the parastades." -- This here also one was not contented with the discovered remains of the stone columns of the second (later) temples, but took up the wooden columns of the preceding one, on the basis of the axial distances found. The stylobates of t the two temples lying transversely over each other (same, pl. 51) are of limestone. Of the older and smaller temple, at the building of the second, there was only removed what fell on the building line. The older one must originally have been arranged one-sided (en parastasin), only receiving a peripteral portico later. For covering it may have served some pieces of painted tiles with archaic ornaments found in the rubbish of the temple. The stylobate step has a width of 2.39 ft., and an average diameter of column of 2.56 to 2.62 ft. must be assumed with an axial distance of 10.60 ft. The diameter of the column and distance between centres agree approximately with those of the Argolic Heraeum.

After one recognizes the position of both temples with regard to each other, and if one considers the resulting conditions at the building of the second temple, he will scarcely have to reckon here with the possibility of tangible evidence for a possible wooden temple, and by the accepted dimensions of the columns and their axial distances, nothing will be proved.

k. Because elevated to the system, the Heraion at Olympia chiefly requires consideration. It is said of this, that "through Dörpfeld's thorough treatment it has become the classical building for the knowledge of the origin of the Doric style." It is permitted to any one to believe that. But if it be definitely assumed, that the cell wall from the upper edge of the external course of slabs now in place consisted of airdried bricks, that the antes and the entablature were of wood, that originally the columns were also of wood on the

places where the stone columns now stand in ruin, and that they were gradually replaced by those of stone, as one passes [illegible] — [illegible] and [illegible] [illegible] load tone, quite to an actual fact behind it. What still exists are the remains of a structure of mixed methods of construction, with stone substructure, wooden ceiling and wooden [illegible] more can be proved.

What has led to the interpretation mentioned for the ruins is first the passage in Pausanias V, 16[1], and then the diversity of the stone capitals in form and dimensions, as well as the fact, that stone architrave, frieze and cornice blocks for the building were not found in the excavations.

[illegible] fragments of Ionic in Tripolis erected the Temple proper (that seen by Pausanias) was built in the Doric style and was made of an oaken trunk. The Temple is 65 ft. long and the consecrated gifts were otherwise exhibited, and that it is rather to be regarded as a memorial of the earlier ancient sanctuary standing on the same place, cannot be denied.

Note 1. Oxylos was the leader in the Doric emigration in 1068 B.C.(1104?), who with the Aetolians conquered Elis, which then formed the ruling aristocracy in the country, and only in 471 (?) built Elis -- its great and populous city.

Pausanias was struck by the single wooden column, itself evidence of cemented alliance. Would he indeed have been struck, if also the stone [illegible] wooden architrave, frieze and cornice? Or would these have been successively changed with the columns?

[illegible] temple with its material details and the single interesting show piece, an ancient wooden column, that be evenly designed as Doric. The sum of the irregularities in the execution still remains as problematical and as hard as the assured

places where the stone columns now stand in part, and that t these were gradually replaced by those of stone, as one became rotten, -- then should this at least not be proclaimed in the loud tone, suited to an actual fact behind it. What still exists are the remains of a structure of mixed methods of construction, with stone substructure, wooden ceiling and wooden framework of the roof, that was covered by clay tiles. Nothing more can be proved.

What has led to the interpretation mentioned for the ruins is first the passage in Pausanias V, 18), and then the diversity of the stone capitals in form and dimensions, as well as the fact, that stone architrave, frieze and cornice blocks f for the building were not found in the excavations.

Pausanias says:-- "According to the Elian tradition, the inhabitants of Skillus in Triphylia erected the Temple about eight years after Oxylos [1] assumed rule over Elis. This (i.e. that seen by Pausanias) was built in the Doric style and was surrounded by columns; of the two in the rear part, one is m made of an oaken trunk. The Temple is 63 ft. long and the builder is unknown." Therefore the wooden column stood in a place in the rear part sheltered from wind and weather, where consecrated gifts were otherwise exhibited, and that it is r rather to be regarded as a memorial of the earlier ancient sanctuary standing on the same place, cannot be denied.

*Note 1. Oxylos was the leader in the Doric emigration in 1996 B.C.(1104?), who with the Aetolians conquered Elis, which then formed the ruling aristocracy in the country, and only in 471 (?) built Elis -- its great and populous city.*

Pausanias was struck by the single wooden column, itself evidence of departed splendor. Would he indeed have been silent, if also then there existed a wooden entablature, i.e. wooden architrave, frieze and cornice? Or would these have been successively changed with the columns?

What Pausanias saw and described was the completed stone temple with its material details and the single interesting show piece, an ancient wooden column, that he expressly designates as Doric. The sum of the irregularities in the execution still remains as problematical and as dark as the assumed

story of the transformation. But he was not certain of the [illegible] liberts of Khilios in the time of the Doric invasion!

[illegible] "[illegible]" [illegible] been the same as that of the later stone supports; their diameters could not have changed much, since the width of the stone stylobate was 4.40 ft. and therefore wooden columns must have had a diameter of 2.25 ft., which would be better if increased to 2.75 ft. (sic!).

The form of the wooden columns in details is entirely unknown, but one must conjecture, that they also had the "cushioned Doric capitals", since then the differences between the [illegible] and the stone columns would at least not be too great. (sic!). That will certainly not be doubted, so far as it affects the conclusions of the principle.

"Nothing was found of the entablature, which with the good preservation of the temple (in what ord this consist ?) might be certain proof, that a stone entablature never existed. This conjecture is not unnecessary, after what we [illegible] from [illegible] of the [illegible] Wooden, "The entablature must have [illegible] [illegible] of the [illegible] or stated. Therefore Dumesnies must have seen it, and should [illegible] use of holes in the abacus of the capitals is evidence for [illegible] by the projecting main cornice, which was itself again constructed [illegible] of the cell wall of the out layer are represented in part [illegible] all holes whatever. And why should they be on the arcus, [illegible]

It is correct and in accordance with my notes, that on the [illegible] th upper course of the cell wall, the dowell holes and also the sinking on the bed surface are wanting, and that the abacus do not touch at the end joints on a corner, but only on [illegible] at the same height as the course of slabs represented. Here

story of the transformation. But he was not certain of the incomplete petrifaction of a wooden temple built by the inhabitants of Skillus in the time of the Doric invasion!

It is said of the wooden columns in the great Olympiawork (p. 30), that it was "self-evident" that their height must have been the same as that of the later stone supports; their diameters could not have changed much, "since the width of the st stone stylobate was 4.40 ft. and therefore wooden columns must have had a diameter of 3.28 ft., which would be better if increased to 3.73 ft. (Sic!).

The form of the wooden columns in details is entirely unknown, but one must conjecture, that they also had the "cake-shaped Doric capitals", since then the differences between t them and the stone columns would at least not be too great. (Sic!). That will certainly not be doubted, so far as it affects the conclusions of the principle.

Nothing was found of the entablature, which with the good preservation of the temple (in what did this consist ?) might be certain proof, that a stone entablature newer existed. This deduction is not overpowering, after what we otherwise know of the ruins of ancient monuments. "The entablature must have remained wooden until the destruction of the temple" is further stated. Therefore Pausanias must have seen it, and should not this statement have been transmitted? Likewise the absence of holes in the abacus of the capitals is evidence for the wooden entablature, which was protected from sun and rain by the projecting main cornice, which was itself again constructed of wood! On plate 18 of the Olympiawork, the ashlars of the cell wall of the cut layer are represented in part with single, then with double, but are furnished with no dowell holes whatever. And why should they be on the abacus, where architraves 10.73 ft. long served on uncertain columns? It is correct and in accordance with my notes, that on the 4 th upper course of the cell wall, the dowell holes and also the sinking on the bed surface are wanting, and that the stones do not touch at the end joints on a border, but only on a sharp edge. But the upper surface of the said course lies at the same height as the course of slabs represented. Here

would men indeed create an accustomed in the necessity, from t
the nature of the bed, in order to carry at the wall from te-
nce. Nothing requires the acceptance of a combination in
ardated bricks. Wooden coverings to necessity the angles of
plastered masonry are certainly believable, even for our can
tion as well!

I. It is stated for the Temple of Hera at Metapontum, that
its columns were of vine wood, on which Pliny (Nat. Hist. XIV.
[illegible] by the ancients counted among the trees.

m. Most Pausanias further says (V, 16, 2) concerns no ter-
ple, but merely architectural parts pertaining to temples. Of
this he writes:-- "The Column of Oenomaos, so-called by the
Elians, stands at the left on the way from the great Alter to
the Temple of Hera; for there stand 4 columns, that with the
roof supported by them serve to protect "the wooden column",
which has suffered much by age and is held together by many
iron bands." The column stood in the house of Oenomaos, the
[illegible] the burning of that.

If we assume that Oenomaos built his house soon after the
founding of the city of Elis (471), then this wooden column
had lasted 271 years, certainly for rest of the time between
a protecting roof supported by stone columns and held toweth-
er by iron bands, also like that in the Heraion at Olympia!

Pausanias (VI, 24) also mentions the Tomb of Oxylos on the
Market at Elis as a building, "low and without walls, moss
roof was supported by wooden columns", indeed as a "special f
[illegible]
the monument remained. If the columns were of the time of
Oxylos, when Pausanias saw them, they must have been approx-
imately 1300 years old!

n. Of cedar wood was likewise the first shrine, the so-c
alled chest of Cypselus (Pausa. V, 17), the large image of
Corinth, in which he was concealed by his mother. And a sim-
ulcure with a wooden molding was also answered to the Tem-
ple of Athena Chalkioikos (which had a bronze house) in Sparta,
(Pausa. III, 16), if the long continuance of the time of the

would men indeed create an equalizing in the masonry, from t the nature of the bed, in order to carry up the wall from thence. Nothing requires the acceptance of a continuation in airdried bricks. Wooden coverings to beautify the angles of plastered masonry are certainly believable, even for our own time as well!

l. It is stated for the Temple of Hera at Metapontum, that its columns were of vine wood, on which Pliny (Hist. Nat. XIV. 3) remarks, that on account of its size, the vine was justly by the ancients counted among the trees.

m. What Pausanias further says (V., 16, 20) concerns no temple, but merely architectural parts pertaining to temples. Of Elis he writes:-- "The Column of Oenomaos, so-called by the Elians, stands at the left on the way from the great Altar to the Temple of Zeus; for there stand 4 columns, that with the roof supported by them serve to protect "the wooden column", which has suffered much by age and is held together by many iron bands." The column stood in the house of Oenomaos, the father of Hippodamia, and it was the only one remaining after the burning of that.

If we assume that Oenomaos built his house soon after the founding of the city of Elis (471), then this wooden column had lasted 371 years, certainly for most of the time beneath a protecting roof supported by stone columns and held together by iron bands, also like that in the Heraion at Olympia!

Pausanias (VI, 24) also mentions the Tomb of Oxylos on the Market at Elis as a building, "low and without walls, whose roof was supported by oaken columns", indeed as a "special f form of temple", that was indeed merely a projecting roof for the monument mentioned. If the columns were of the time of Oxylos, when Pausanias saw them, they must have been approximately 1000 years old!

n. Of cedar wood was likewise the first shelter, the so-c called chest of Cypselus (Paus. V, 17), the later tyrant of Corinth, in which he was concealed by his mother. And a structure with a wooden nucleus was also asserted to be the Temple of Athena Chalkiokos (which had a bronze house) in Sparta, (Paus. III, 17), if the long continuance of the time of its

exaction does not express his contempt. Tyrannos began the
monument, that his sons continued after his death, but it
was only completed many years later by the Peisistratids. The
numerical covering of bronze plates, on which were repeated the
[illegible]
in relief), were the most important and worth seeing in the
capital, according to Pausanias' opinion.

A bronze room in a subterranean building among the Archives,
that Aorisios had built for the preservation of his daughter,
is mentioned by Pausanias (II, 25). While covered by gold
plates were also shown by the Temple of Solomon at Jerusalem
(1000 B.C.) and still earlier by the Thrions at Ugarit.

Upon that is positive in the search for original wooden tem-
ples cannot be recorded: the painted representations on pott-
ery from the early period likewise afford nothing definite or
even merely indirectly in the representations of other public
buildings, the spring-houses. Thus for example, the early
Greeian so-called Ramnois vase (500 B.C.) [1] shows us two de-
ic of wood, consisting of strongly diminished columns between
antes, with an architrave laid thereon, bridging frieze and
cornice adorned by leaves, after the Egyptian or Phoenician type,
above this being a flat vaulted roof (instead a [illegible] roof).
All bears the character of a simple and clear wooden construc-
tion, where the capitals on the through shafts of the columns
must be regarded as knobs, as also those on the not slightly
projecting deep shaped capitals of the first view do not oppo-
one execution in wood. Another view is shown by a clay fig-
ured bucrie from the tire of the Tyrrens (500 B.C.) [2] then
represents a portico supported by four thin columns with cor-
bels placed thereon. The architrave on them is shorted and
is properly only indicated, the regulas are reduced and are
merely sketched, as well as the beam ends and the cornice.
But here is also a wooden architrave expressed in fear not
proportions; one must only regard the capitals not as "Doric
cushion-shaped", but as corbels, as shorted. The most possibly
on already Egyptia the association of like dimensions in depth.

Note 1. Now exhibited in the Etruscan Museum in Florence.

Note 2. Now in the British Museum in London. Published by
Fr. Wiegand in Antike Denkmäler. II. Bd. 19. Text p. 7.

erection does not express the contrary. Tyndareos began the structure, that his sons continued after his death, but it was only completed many years later by the Lacedamonians. Its internal cowering of bronze plates, on which were repeated the labors of Hercules and also historical events (indeed as works in relief), were the most important and worth seeing in the capital, according to Pausanias' opinion.

A bronze room in a subterranean building among the Argives, that Acrisius had built for the preservation of his daughter, is mentioned by Pausanias (II, 23). Walls covered by gold plates were also shown by the Temple of Solomon at Jerusalem (1000 B.C.) and still earlier by the Tholos at Mycenae.

Much that is positive in the search for original wooden temples cannot be recorded; the painted representations on pottery from the early period likewise afford nothing definite or even merely indirectly in the representations ofcother public buildings, the spring-houses. Thus for example, the early Grecian so-called Francois vase (500 B.C.) [1] shows us two Doic of such, consisting of strongly diminished columns between antes, with an architrave laid thereon, triglyph frieze and cornice adorned by leaves, after the Egyptian or Etruscan type, above this being a flat vaulted roof (indeed a clay roof). All bears the character of a simple and clear wooden construction, where the capitals on the through shafts of the columns must be regarded as knots, as also those on the but slightly projecting pear shaped capitals of the first view do not oppose execution in wood. Another view is shown by a black figured hydria from the time of the Tyrants (560 B.C.?) [2] that represents a portico supported by four thin columns with corbels placed thereon. The architrave on them is stunted and is properly only indicated, the regulas are recessed and are merely sketched, as well as the beam ends and the cornice. But here is also a wooden architrave expressed in form and proportions; one must only regard the capitals not as "Doric cake-shaped", but as corbels, as stated. The great projection already forbids the assumption of like dimensions in depth.

*Note 1. Now exhibited in the Etruscan Museum in Florence.*

*Note 2. Now in the British Museum in London. Published by Th. Wiegand in Antike Denkmäler. II. pl. 19. Text p. 7.*

On the pteraia of the form of Greek wooden architecture,

2. Rodenwaldt also sees position and proportions more and resultant in the "imitation" of the concrete above forms in wood. What he asserts:-- "In wood as the natural building material must one now attempt to explain the historical forms, rather been to reach backward. We have accurately learned by observations in different countries and for different periods the use of the wooden column (the use indeed -- but not the form and decorations), and for Doric construction of the earliestime, a certain influence of wooden construction is not to be absolutely denied. (Agreed, except that here the Ionic should be given upon to a still higher degree). Proceed to the answer to which the difficult question concerning the influence of wood is briefly repeatedly and answered, one could generally seem rather more sane and reasoning and also some must more circumspection"-- which certainly must be commended without reserve.

In Wetzelitulen und Stadtlen. 1. 219 et seq. Berlin. 1929.

On the columns he notes:-- "Referred to the monumental material in which they originated, the column and the note in the Ionic style is certainly a stone (Lithotonic) and not a wooden (xylonic) creation. To represent an ancient form [illegible] — [illegible]. [illegible] determine, that wooden columns with their characteristic peculiarities and proportions of diameter to height are evolved from the two historical course: where they occur on the representations or [illegible] and later, they exhibit the form and proportions replaced by wooden construction.

[illegible]

[illegible]. and in the same: [illegible]. [illegible] 1927. [illegible] d.

It is otherwise for the substructures and particularly for both orders.

If the note temple ("Temple-ruins in Doorsy. p. 424) is the closest form of the Greeks modes of the deity, as we must as-

On the question of the form of Grecian wooden architecture, O. Puchstein [3] also takes position and recommends care and restraint in the "indication" of the compound stone forms in wood, when he asserts;-- "On wood as the natural building material must men now attempt to explain the historical forms, rather than to reach backward. We have accurately learned by excavations in different countries and for different periods the use of the wooden column (the use indeed -- but not the form and decoration!), and for Doric ornamentation of the entablature, a certain influence of wooden construction is not to be absolutely denied. (Agreed, except that here the Ionic should be drawn upon to a still higher degree). Opposed to the manner in which the difficult question concerning the influence of wood is chiefly represented and answered, one could generally show rather more care and restraint and also somewhat more circumspection"-- which certainly must be acknowledged without reserve.

*Note 3. Puchstein, O & R. Koldewey. Die Griechische Tempel in Unteritalien und Sizilien. p. 219 et seq. Berlin. 1899.*

On the columns he notes:-- "Referred to the monumental material in which they originated, the column and the ante in t the Doric style is esthetically a stone (lithotomic) and not a wooden (xylurgic) creation. To represent an ancient Doric column as a primitive and still plausible wooden form is absurd --- etc." [1] Assenting to this principle would therefore determine, that wooden columns with their characteristic peculiarities and proportions of diameter to height are excluded from the two historical orders; where they occur on the representations of spring-houses and baths, they exhibit the forms and proportions required by wooden constructions.

*Note 1. Also compare on this, Bohnsack, G. in Brunswick; War die Heraion ursprunglich von Holz? In Bauz. für Wurtemberg., Baden, Hesse, Alsace-Lorraini. III Jarh. Nov. 10. 1906. No. 45, and in the same; Durm, J. III Jahr. 1907. No. 6.*

It is otherwise for the entablatures and particularly for both orders.

If the ante temple (Temple-maison in Choisy, p. 424) is the oldest form of the Grecian house of the deity, as we must as-

ananke in accordance with the still stylobate Western of Zeus-
stoor near modine (Pausa [3]), to the ancient Temple of Athe-
na (Parthenon) of about 570 B.C. on the Acropolis of Ath-
ens [5], and according to the archaic little temples, which do
under the name of "treasury" (Olympia, Delphi [6]), then
the first normal ancient sanctuary, built of ashlars, which
is neither triglyphs nor metopes, but only simple horizontal
enclosing main columns and the corresponding pediment corni-
ces, within which according to the tiles, pediment groups
were not impossible, and likewise must the Treasury of the
Delians at Olympia have been without definite stylistic orna-
ment, -- while other contemporary buildings were given a tri-
glyph frieze, both on the pediments as well as at the eaves.

Note 3. See Puchstein, o. pl. 11; p. 32, from 7 th century
B.C.

[illegible]
ten Acropolis zu Athen. p. 108. Tiv. 172. Cassel & Berlin.
1904.

Note 6. See the great Ionian Dipteral temple and the corresp-
onding substructure of the Heraeon on Delos -- Les Restitues
de Delphes. -- Paris. 1909.1910.

[illegible]
requires a change in the position of the ceiling beams, i.e.,
a so-called manner, that appears necessary condition for an an-
ne temple built of wood, and as having nothing common with
[illegible]
or the Dorian rock-cut tombs.

On the vase paintings mentioned, we have to conceive before
us an open portico before a poor wall of masonry, where free
supports bear horizontal wooden beams lying parallel to the
wall, that serve as support for horizontal ceiling beams. The
concrete beams are set at certain distances apart, thus leav-
ing free spaces between their ends, that are left open or clo-
sed by panels, slabs or similar masonry.

[illegible]
that allow protection to the lower parts of the building, and
roofs by means of a continuous band connects and processes the
ends of the rafters. The similar arrangement for protection

assume in accordance with the still styleless Megaron of Demeter near Selinus (Gaggera [2]), to the ancient Temple of Athena (Hekatompedon) of about 550 B.C. on the Acropolis of Athens [3], and according to the archaic tittle temples, which go under the name of "treasury" (Olympia, Delphi, Delos [4]), then the first normal archaic sanctuary, built of ashlars, exhibits neither triglyphs nor metopes, but only simple horizontal enclosing main cornices and the corresponding pediment cornices, within which according to the finds, pediment groups were not impossible, and likewise must the Treasury of the Geloans at Olympia have been without definite stylistic ornament, -- while other contemporary buildings were given a triglyph frieze, both on the pediments as well as at the eaves.

*Note 2. See Puchstein, O. Pl. 11; p. 82, from 7 th century B.C.*

*Note 3. See Wiegand, Th. Die archaischen Porosarchitekturen der Akropolis zu Athen. p. 108, Fig. 112. Cassel & Leipzig. 1904.*

*Note 4. See the great German Olympiawork and the now appearing publications of the French on Delphi -- Les Feuilles de Delphes. -- Paris. 1902.1905.*

Judging from the angle triglyphs, the latter design would require a change in the position of the ceiling beams, i.e., a so-called header, that appears scarcely credible for an ante temple built of wood, and as having nothing common with the simple ancient wooden construction, as it was expressed in the Lycian rock-cut tombs.

On the vase paintings mentioned, we have to conceive before us an open portico before a rear wall of masonry, whose free supports bear horizontal wooden beams lying parallel to the wall, that serve as support for horizontal ceiling beams. The separate beams are set at certain distances apart, thus leaving free spaces between their ends, that are left open or closed by panels, slabs or airdried masonry.

Above this entablature lie the somewhat projecting rafters, that afford protection to the lower parts of the building, and which by means of a continuous band connects and protects the ends of the rafters. The similar arrangement for protection

beams for the best stones, as for example on wooden beams in the Tyrol, Switzerland etc., on the ends of ceilings, and which has remained in use till today. The fastening of the verge board required a special means, since a railing of this against the end wood was also then regarded as bad or not permissible. A clay roof with smooth coating, or a covering of tiles and an overall or hipped form terminated the building at top. This arches and simply noble genus was employed on the cathedrals, from which one could not depart in the later stone construction or mixed architecture, if the detail forms were also covered by painting or sculpture corresponding to the time. With reference to the statements of Vitruvius (IV, 1 to 4), Fig. 290 affords a view of the architecturally possible, represented without constraint, based only on what the rise antiqua and wooden construction require. Yet similar is the case, if we examine the front and side elevations of a Lycian tomb (see division XIV, Tombs), that the ancient wooden house of the vicinity gives us from the bronze period. The Tomb is conservative, and the hardy mountaineers likewise show this in the land of every master, just as the wooden b[illegible] buildings in the Alps now remained the same, at least until today.

In the Lycian structures there lie timbers or beams of large dimensions, projecting are enclosing walls and projecting transverse at certain distances, on them being closely set upheavings and round trunks, that form the ceiling and support the roof, whose edges are enclosed and finished by timbers. The same expression of form as in these buildings in Asia Minor, we have learned to recognize in the second Great Tombs in Xanthos, and which proves its high antiquity more than all else. This "native" style has also been faithfully retained by the Ionians in the great stone temples, when they continued faithful to the sequence of the parts of the entablature in the transformation from wood to stone. The arrangement of a fi[illegible] [illegible] is frequently doubted.(77)

On the architrave lie the square hewn timbers instead of round logs, which are reproduced in the dentils. Like the

occurs for the beam stones, as for example on wooden houses in the Tyrol, Switzerland etc., on the ends of purlins, and which has remained in use till today. The fastening of the verge boadr required a special means, since a nailing of this against the end wood was also then regarded as bad or not permissible. A clay roof with smooth coating or a covering of tiles and in curved or hipped form terminated the building at top. This artless and simply noble means was employed on the structure, from which one could not depart in the later stone construction or mixed architecture, if the detail forms were also covered by painting or sculpture corresponding to the time. With reference to the statements of Vitruvius (IV, 1 to 4), Fig. 360 affords a view of the architecturally possible, represented without constraint, based only on what the vase paintings and wooden construction require. Yet simpler is the case, if we examine the front and side elevations of a Lycian tomb (see Division XIV, Tombs), that the ancient wooden house of the vicinity gives us from the bygone period. The South is conservative, and the hardy mountaineers likewise show this in the lands of every master, just as the wooden b buildings in the Alps have remained the same, at least until today.

On the Lycian structures there lie timbers or beams of large dimensions, protecting the enclosing walls and projecting therefrom at certain distances, on them being closely set unhewn and round trunks, that form the ceiling and support the roof, whose edges are enclosed and finished by timbers. The same expression of form as in these buildings in Asia Minor, we have learned to recognize in the second great Tholos in Mycenae, and which proves its high antiquity more than all else. This "native" style has also been faithfully retained by the Ionians in the great stone temples, when they continued faithful to the sequence of the parts of the entablature in the transformation from wood to stone. The arrangement of a frieze in the ancient stone buildings (Priene, Temple of Asclepios) is frequently doubted.(?)

On the architrave lie the square hewn timbers instead of round logs, which are reproduced in the dentils. Like the

Doric, the Ionic race has also remained bound in its structure to wooden models, and under its influence [illegible] must themselves free from a direct transfer of wooden forms into stone.

The same temple results in accordance with the preceding f according to the location -- the Doric style being assumed -- a trilobed frieze being only on the pediment and or only on the lower screen, just as in the Ionic style the round or [illegible] only of the triglyphs, or the metopes developed therefrom, can also only occur on the sides or on the ends in the accession style, and not on both at the same time. The entablature and its cornices in the Doric and Ionic orders doubtless originated from the original wooden construction of those parts, just as it is certain for the Doric, that its form of column had nothing to do with such.

If now on the oldest rate buildings in stone the existence is the case without exception on stone buildings from the 7th and 6 th centuries B.C., then must it be said, that men were not concerned with a petrification of wooden construction and freely employed the given structural motives, when the [illegible] as we have learned to know it from the portices of the temples purely decorative connection and treatment of the said [illegible] occur triglyphs above the antes of the "prodomos" and the opisthodomos and on the entablature of the encircling portico on all four sides. The ancient Bekrowmoeden (in antis) on the Acropolis of Athens (before 480 B.C.) had a trilobed frieze on all four sides,[1] according to the finds and the inscribed restoration by Th. Wiegand and others.

[1] [illegible] an Athen by Th. Wiegand und GM. Pfeil, Milliemon, Sonderausgabe, W [illegible] Tafel I [illegible]. The [illegible] of the lower axis determine the connection without columns

Doric, the Ionic race has also remained honest in its structures; both follow the same path, and under the same conditions, hold themselves free from a direct transfer of wooden forms into stone.

The ante temple results in accordance with the preceding f from a construction of the entablature and cornice in wood, according to the location -- the Doric style being assumed-- a triglyph frieze being only on the pediment end or only on the longer sides, just as in the Ionic style the round or square ends of the timbers, or the dentils developed therefrom, can also only occur on the sides or on the ends in the wooden style, and not on both at the same time. The entablature and its cornices in the Doric and Ionic orders doubtless originated from the original wooden construction of those parts, just as it is certain for the Doric, that its form of column had nothing to do with such.

If now on the oldest ante buildings in stone the existence of the triglyph frieze on all four sides may be proved, which is the case without exception on stone buildings from the 7 th and 6 th centuries B.C., then must it be said, that men were not contented with a petrifaction of wooden construction and freely employed the given structural motives, when the temple became stone. The triglyph frieze on all four sides indicates a freedom from the simple and sound construction, as we have learned to know it from the porticos of the fountain houses and the rock-cut tombs in Asia Minor, and a complete purely decorative conception and treatment of the said motive, that is yet enhanced, as soon as on the same building occur triglyphs above the antes of the "prodomos" and the opisthodome and on the entablature of the enclosing portico on all four sides. The ancient Hekatompedon (in antis) on the Acropolis of Athens (before 561 B.C.) had a triglyph frieze on all four sides,[1] according to the finds and the inspired restoration by Th. Wiegand and others.

*Note 1. See Die archaische Porosarchitektur der Akropolis zu Athen by Th. Wiegand and Dörpfeld, Gillieron, Schrader, W Watzinger & Wilberg. Cassel & Leipzig. 1904. The fragments of the longer side determine the construction without columns,*

[illegible] angle triglyph is reached, as well as the inferior pediment covering with its inverse colored ornamentation, the horizontal cornice with mutules, drops and guttae, with the corresponding angle block, triglyphs and metopes are further displaced as the fragments of the columns between the cores, the layer fragments of the capitals are determined, as well as cores areas of the architrave, which still exhibit traces and mutules.

Wooden railings over the architrave portico and over the roof, in this being small stone columns set on each other, as well as the wooden gable roof with a covering of tiles was restored for the stone temples as traditional, and indeed in exactly the same form, as it was constructed at a smaller scale in the preceding wooden temples -- enclosed, tiles on each other at right angles with smaller beams laid on them and covering boards as a termination of the resulting rectangle between the horizontal beams.

If other forms appear in the stone railings of the architrave portico, they are made possible by the nature of the material; but the precedy always reproduce the coffered ceiling! Therefore we shall not err, if we assume as certain subsequently a faithful imitation of a preceding wooden architecture. A construction in the sense of Semperian stone architecture (kat'exochen) is to be rejected for the Doric temple [illegible] [illegible], and in part their railings are their parts, just have a [illegible] stone, as well as the antecedents of the internal architecture, and there have remained in wood only the ceiling of the cell and the framework of the roof in all decisions.

The mixed mode or construction in wood and stone is not [illegible] the criterion for the temple of the historical period, that become stands from the 7 th century onward. Reality it must always remain the mode of transition, especially where it relates to great structures, if the same elements are [illegible]

In modern construction the material peculiarities of the materials, their advantages and defects, that consist in easy

*the angle triglyph is assumed, as well as the inclined pediment cornice with its incised colored ornamentation, the horizontal cornice with mutules, drops and vias, with the corresponding angle block, triglyphs and metopes are further assured by 158 fragments of the columns between the antes, two larger fragments of the capitals are determined, as well as some pieces of the architrave, which still exhibit taenia and regulas.*

Wooden ceilings over the enclosing portico and over the cell, in this being small stone columns set on each other, as well as the wooden gable roof with a covering of tiles was retained for the stone temples as traditional, and indeed in exactly the same form, as it was constructed at a smaller scale in the preceding wooden temples -- enclosed, timbers crossing each other at right angles with smaller beams laid on them and covering boards as a termination of the resulting rectangle between the horizontal beams.

If other forms appear in the stone ceilings of the surrounding portico, they are made possible by the nature of the material; but they properly always reproduce the coffered wooden ceiling! Therefore we shall not err, if we assume as possible substantially a faithful imitation of a preceding wooden architecture. A construction in the sense of Egyptian stone construction (kat'egochen) is to be rejected for the Grecian temple. Supports, cell walls, entablatures of the enclosing porcos, and in part their ceilings are their parts, that have b become stone, as well as the supports of the internal architecture, and there have remained in wood only the ceiling of the cell and the framework of the roof in all periods.

The mixed mode of construction in wood and stone is and remains the criterion for the temple of the historical period, that became stable from the 7 th century onward. Peculiar m must always remain the mode of transition, especially where it relates to great structures, if the same elements are transferred from small ornamental architecture into the colossal.

In wooden construction the natural peculiarities of the materials, their advantages and defects, that consist in easy

working, in "quillen", warping, shrinking and cracking, require too small sections for the structural elements; but on t the contrary, stone construction demands large dimensions, especially if it relates to the use of the not very hard and firm or easily crushed stones. (Porous limestone and sandstone in in contrast with dense and crysaalline limestone or granite; see Fig. 361, the rebuilt stone columns of the Heraion at Olympia).

Wood excludes tall supports on account of flexure, or it p permits them only with the use of tension bands, -- on the contrary stone makes possible such without additions. The stones employed on the oldest ashlar monuments are easily wrought, porous, splitting when wet, that only later must give place to dense stones, worked with difficulty or only with iron tools. The oldest stone temples, both in the mother country (Corinth), as well as in the colonies (Tarentum, Syracuse, Selinus and Metapontum) are characterized by "overpowering Doric heaviness and superfluous strength", that of the best period and the Ionic, which are almost always built of the best dense and crystalline limestone,-- by the elegance and greater slenderness of the supports and by lighter entablatures, recalling the Persian porticos. The quality of the material produced this change, from which the masters of the tombs in Mycenae already knew how to derive advantage by their slender columns.

Thus must be explained the abrupt change in the proportions of the structural members in form and magnitude between the preceding wooden construction and the oldest stone construction, that was again corrected in the later noble structures.

Since the Doric cornice assumes the existence of a strong roof framework with terra cotta tiles, and the Ionic a flat terrace roof of earth or clay on a closed wooden basis, there were smaller sections of the timbers for the Ionic order in contrast to the Doric, and if there appeared as basal motives for the form of the capitals of wooden Doric free supports, knots or corbels cut in parabolas at the ends, or pear-shaped turned knobs, then the like results for the Ionic, but with changed terminal forms of the corbels with scrolled endings--

the capital, it is nothing more than a one-piece, that supports the architrave and receives the upper end of the post serving as a column," says Choisy on this point (r. 8ve).

We have explained the wooden antes for stylized brick construction as simple protections for this sort of masonry at the free ends of walls, as well as similar precautions at openings for passage, thus at doorways were necessary for the same reasons, and which then further led to form the jambs of the door leaves. They were expectations for structural reasons, but for reasons of form, as designating the ending of a wall, they were continued in stone construction.

The "base blocks" or plinth slabs set vertically on the exterior of the cell walls are explained as reminiscences of the ancient brick walls imported from the East, and which may be possible. Structurally, they have no meaning in stylized brick construction nor in earlier construction; for in the former they are merely a protection against weather, and in the latter are merely a bad arrangement! (Also see further the Phoenician stone buildings: Fig. 121).

Since as already stated, a perfected stone construction, both in structural and in ornamental respects, is moved in the field possess by the still existing towns, palaces and masonry structures in Mycenae, Tiryns and other places, already known before the Trojan war (1194-1184) and the invasion and Dorians under Oxylos, and indeed also earlier, then must have been for these immigrants not difficult the transition from a pure wooden style to a stone style.

"In fact stone architecture also proceeded from the southeast angle of the Mediterranean Sea, and like wine and oil, spread step by step over the coasts and peninsulas of southern Europe and from thence over the civilized world. Phoenicians in the primeval period had taught to the Greeks the art of masonry and terra cotta construction, Greeks brought them later to the Etruscans and Latins, and from Italy they came in a very late age to the peoples beyond the Alps."(See Vitter Man. p. 117).

II. The Temples constructed in stone and wood concerning t

horizontally projecting volutes, receiving a load"."As for t the capital, it is nothing more than a cap-piece, that supports the architrave and receives the upper end of the post serving as a column," says Choisy on this point.(P. 339).

We have explained the wooden antes for airdried brick construction as simple protections for thes sort of masonry at t the free ends of walls, as well as similar precautions at openings for passage, thus at doorways, were necessary for the same reasons, and which then further had to form the jambs f for the door leaves. They were superfluous for structural reasons, but for reasons of form, as designating the ending of a wall, they were continued in stone construction.

The "base blocks"or plinth slabs set vertically on the exterior of the cell walls are explained as reminiscences of the ancient brick walls imported from the East, and which may be possible. Structurally, they have no meaning in airdried brick construction nor in ashlar construction; for in the former they are merely a protection against weather, and in the latter are merely a bad arrangement! (Also see further the Phoenician stone buildings; Fig. 17).

Since as already stated, a perfected stone construction, b both in structural and in ornamental respects, is proved in the Pele ponessus by the still existing tombs, gateways and masonry structures in Mycenae, Tiryns and other places, already known before the Trojan war (1194-1184) and the immigrating Dorians under Oxylos, and indeed also current, then must have been for these immigrants not difficult the transition from a pure wooden style to a stone style.

"In fact stone architecture also proceeded from the southeast angle of the Mediterranean Sea, and like wine and oil, spread step by step over the coasts and peninsulas of southern Europe and from thence over the civilized world. Phoenicians in the primeval period had taught to the Greeks the art of masonry and terra cotta construction, Greeks brought them later to the Etruscans and Latins, and from Italy they came in a v very late age to the peoples beyond the Alps."(See Victor Hehn. p. 117).

II. The Temples constructed fo stone and wood comprise t

the greatest number of the monuments, that have remained to us.

a. In regard to the materials of the stone temple Pausanias states, that the centaurs (who lived in Arcadia) built the in Tegea was built of unburnt bricks, and further a little Chapel of Asclepios in Pancaeus in the Phocian country, and the neighboring Temple in Stiris -- cities that possessed neither roofs. Similarly, Vitruvius says, temples were built in low lands, like mountain cabins on a torrent. He also mention here a part of the walls of Troy (Hissarlik) and the cell walls of the Heraion at Olympia, combining fillstone-stacked brickwork.

b. Examples of Asoric in masses (later roofs in marble by Pausanias), a Temple of Proserpina near Argos, and the earlier Pelopeion in Olympia, whose cell walls appear as dense masonry, according to the German excavations, which is still covered by a red plaster coating. The pre-Persian buildings in Corinth exhibit brick walls with lime mortar already in 1200 B.C., as previously represented.

c. Of natural and early wrought stones without the aid of mortar, even in the foundations, but joined together by metal cramps and dowells, with careful dressing of the beds and surfaces and a rational stone bond, are to be mentioned as the oldest temples of the Doric style the porus (limestone) Temple on the Acropolis of Athens; the ancient, and the new Apollo-temple built anew by Pisistratos.

Here as in all succeeding buildings of the historical style the structural and aesthetical principle is the Cantilever and Tension: they fulfill a purpose, and only with the capital begins the play of representation. Very [illegible] Greeks in the matter as not required for work.

The entablature receives the same actual roof structure, which is composed of plates, pairs of rafters and purlins connected in triangular form, closed by a gable wall at each end of the structure. The space within the triangle affords a further field for ornamentation, where the architect has then foreseen a richer figure decoration. Neither this as the ce-

the greatest number of the monuments, that have remained to us.

a. In regard to the materials of the stone temple Pausanias states, that the portico (then roofless and fallen) of Kotys in Epidauros was built of unburnt bricks, and further a little Chapel of Asclepios in Panopeus in the Phocian country, and the neighboring Temple in Stiris -- cities that possessed neither market, gymnasium, theatre and no water, where men dwelt in low tents, like mountain cabins on a torrent. We also mention here a part of the walls of Troy (Hissarlik) and the cell walls of the Heraion at Olympia, probably built of air dried bricks masonry

b. Constructed of burned bricks were then the ancient Temple of Apollo in Megara (later rebuilt in marble by Hadrian), a Temple of Proserpine near Argos, and the said Philippeion in olympia, whose cell walls appear as poros masonry, according to the German excavations, which is still covered by a red plaster coating. The phemymenean buildings in Gournia exhibit brick walls with lime mortar already in 1800 B.C., as previously represented.

c. Of natural and early wrought stones without the aid of mortar, even in the foundations, but joined together by metal cramps and dowells, with careful dressing of the beds and surfaces and a rational stone bond, are to be mentioned as the oldest temples of the Doric style the poros (limestone) Temple on the Acropolis of Athens; the ancient, and the new Hekatompedon built anew by Pisastratos.

Here as in all succeeding buildings of the historical style is expressed the structural principle in the supports and beams; they fulfil a purpose, and only with the capital begins the play of ornamentation, that further appears in the metopes not required for work.

The entablature receives the again actual roof structure, which is composed of plates, pairs of rafters and purlins combined in triangular form, closed by a gable wall at each end of the structure. The space within the triangle affords a further field for ornamentation, where the architect has then foreseen a richer figure decoration. Neither this as the or-

[illegible] on the column top in the Frieze dispenses the plain-

[illegible]

[illegible] p. [illegible].

The panels and architrave [illegible] as the Isaeo-[illegible] [illegible] B.C., and as the time per-[illegible] political activity is to be placed the building of [illegible] Peraeeeeon. As a Doric date temple of 10.85 ft. [illegible] and triglyph friezes and frieze panels in the pronaos [illegible] 1931, according to the frieze it was built of a [illegible] red-yellow limestone, whose remains exhibit a coating of white plaster and a connection of the stones by means of [illegible] dowels 2 ins. long and set in cast lead. The corres-[illegible]

[illegible], with Propylaea on a base slab 0.75 ft. higher, with a stoop colonnade of all parts. [1] The architrave is composed [illegible] the main moulds, the corbelings are carved plaster [illegible] ?), the mouldings of marble or of limestone covered [illegible] marble slabs, the cornice band slopped white with tinted and vertically colored line dentels, the lower sphinxes and the amphibia of the cornice painted colored red, producing a [illegible] effect on a white ground, in which the [illegible] colors are muted in harmony by the light [illegible] [illegible].

[illegible]

[illegible] long [illegible], and built in [illegible]. [illegible] [illegible] by the [illegible] in 1890).

"A massive architrave painted on white columns and with a red band interrupted by [illegible] regulae, above which was [illegible] colonnade between white metopes, the whole shadowed by a classical cornice with red fascia, over which appears the [illegible] painted lobes ornamentation of the cyma. Added [illegible] are the acroteria with acroteria of the [illegible] and the [illegible] idea of supporting the appearance of the [illegible] by [illegible] the antecedents of the inclined cornice [illegible] with [illegible]

"Upon a building could not lack effect on a people, whose taste, as shown by the sterne sculptures of the pediments, was

ornament on the columns nor in the frieze obscures the structural ieda; --"the same esthetic truth", that characterizes the structural part of the style, is also expressed in the ornamentation.(See Zielinski. p. 98).

The gentle and art-loving Pisastratos appeared as the leading personage at Athens in 561-528 B.C., and as the time before his political activity is to be placed the building of the older Hekatompedon. As a Doric ante temple of 40.25 ft. facade with triglyph frieze and figure groups in the tympanums (Fig. 362), according to the finds it was built of a hard reddish-yellow limestone, whose remains exhibit a coating of white plastering and a connection of the stones by means of bronze cramps 8 ins. long and set in cast lead. The corresponding figure groupsrepresent Typhon and the great Triton w wrestling, with Hercules on a base slab 0.72 ft. higher, with a strong coloring of all parts.[1] The architrave is covered with fine white stucce, the triglyphs are painted blackish (blue-black ?), the metopes of marble or of limestone covered by marble slabs, the cornice being stuccoed white with incised and variously colored line ornaments, the three astragals and the annulets of the echinus capital colored red, producing a polychromatic architecture on a white ground, in which the different materials are united in harmony by the light stucco coating.

*Note 1. The base slab inserted above the cornice is also found again on the Temple of Concordia at Akragas, certainly very much later, and still in place.(Fig. 164: perspective view made by the author in 1890).*

"A massive architrave resting on white columns and with a red band interrupted by blackish regulas, above which were blackish triglyphs between white metopes, the whole shadowed by a blackish cornice with red facia, over which spreads the brightly colored lotus ornamentation of the cyma. Added thereto are the scrolled white acroterias of the facade and the fanciful idea of enhancing the appearance of the tympanum by painting the underside of the inclined cornice slabs with great flying birds and extended flower compositions". -- "
"Such a building could not lack effect on a people, whose taste, as shown by the glaring sculpture of the pediment, was

still predisposed by the influence of the refined Ionic mesile architecture". By these two endeavoring, Th. Wiegand characterises this aureole building.

Architectually proper in form is treated the peristoral structure of transferred of 4 x 8 columns succeeding this site t temple. The foundations consist of near reddish-gray fine-grained tufa fragments and of bluish limestone, while the columns, architraves, cornices and coverings are of porous (fineness limestone, a coloured fresh-water limestone of a yellowish or reddish color), that was covered by very fine stucco. Antecedent pavement cornices and architraves, eave and roof tiles were made of white coarse-grained marble, and the upper portions of the cella walls were entirely constructed of porus.

The architects of the aforementioned portico consisted of a single cella step, the columns were made of blocks of varied marble, joined together by square wooden dowells. The architrave was composed of two slabs set on edge beside each other, connected together by 5 clamps. The shafts of the columns were covered by 20 flutes, their diameter being taken at 5.41 to 5.75 m. Their height has remained indeterminate; on the contrary, the strongly profiled capitals are assumed with four small-in and four lonicrons at the medium, as well as the painting of the arms. In the pediment across the rule was not colored, the glittering color of the marble would have [illegible] a fine effect.

Indeed for the same period date the remains of five smaller porus pilasters on the said acropolis, on which models of varied middle and also cut two rows of stone, overcrowd with four and five floors, painted made capitals and t lists, porus columns (published by me in 1892) were found, with a strongly projecting architrave, these samples are from pedimental decorations. The Ionics were issued of the same age as the angular Ionics of Athens and are not to be regarded as antecedent [illegible]

The equalizing marble block for those is also to be mentioned, as well as two corresponding veneered terra-cotta cymas and antefixes. Porus elements of the Ionic style have not

still unaffected by the influence of the refined Ionic marble sculptures". By these two expressions, Th. Wiegand characterizes this archaic building.

Esthetically richer in form is treated the peripteral structure of Pisastratos of 6 × 12 columns succeeding this ante t temple. Its foundations consist of hard reddish-gray limestone from Hymettos and of bluish limestone, while the columns, architraves, triglyphs and cornice are of poros (Piraeus limestone, a porous freshwater limestone of a yellowish or whitish color), that was covered by very fine stucco. Metopes, pediment cornices and sculptures, cyma and roof tiles were made of white coarse-grained marble, and the upper portions of the cell walls were entirely constructed of poros.

The stylobate of the surrounding portico consisted of a single ashlar step, the columns were made of drums of varied heights, joined together by square wooden dowells. The architrave was composed of two slabs set on edge beside each other, connected together by H champs. The shafts of the columns were covered by 20 flutes, their diameter being taken at 5.41 to 4.26 ft. Their height has remained indeterminate; on the contrary, the strongly projecting capitals are assured with four annulets and four incisions at the necking, as well as the painting of the cyma. In the pediment groups the nude was not colored,"the gleaming color of the marble would have its effect", they substantially stood in white against a dark, indeed a blue background.

Indeed for the same period date the remains of five smaller poros buildings on the said Acropolis, on which mutules of varied widths and with but two rows of drops , cornices with only four and five drops, painted ante capitals and twisted poros columns (published by me in 1892) were found, with a strongly projecting echinus, three annulets and four necking incisions. The latter were indeed of the same age as the ancient Temple of Athena and are not to be regarded as supporting columns in a structure, but rather as supporters of consecrated gifts.

The equalizing marble block for those is also to be mentioned, as well as the corresponding variegated terra cotta cymas and antefixas. Poros structures of the Ionic style have not

been found, since this suggested later from the back to the [illegible]

The quadrant and most forecourts period, Corinth remained under the Byzantine (400-650 B.C.), and in this must be placed the [illegible] of the first half [illegible].

[illegible] accessible with 6 × 17 columns, those of the facade having larger diameters than those of the sides. (5.84 to 6.41 ft.). Seven of these yet stand, connected by architraves 12.38 ft. long, that still exhibit the taenia and regulae. The capitals proper, not strangely, have a thin abacus, three annulets without coves and large incisions at the backing. The shafts exhibit 20 flutes, are slightly diminished and have no entasis. Built of porous limestone, the surfaces have a yellowish-red coating of stucco.

It belongs to the peaviest of all Doraeae temples.

The similar heavy proportions is the very archaic in Doraeae, that may be placed in the first half of the 6 [illegible] century. The columns here coliginally 7.73 ft. high, with lower diameters of 6.73 ft. and upper ones of 5.77 ft., spaced 7.83 ft. between centres, and having 21 flutes. The architrave leave between them a space of not 4.75 ft.

In the same early period -- end of the 7 th or beginning of the 6 th century -- may be referred the Dyncaion in Dyrcoae, of which there are but two monolithic columns with 16 flutes, which count from a plain band above the anylobate. Of this were found parts of the capitals on the column and the [illegible], that were necessary for the course and [illegible] shell [illegible].

[illegible] it certain. [illegible]

[illegible] the [illegible] of the [illegible] architrave's inscription on the stylobate -- the Temple of Apollo on Dorgia (Dyrcoae) -- must be placed here. Dorgiani-[illegible] would even refer the building back to the 5 th century B.C.; on the contrary, the character of the [illegible] on the stylobate indicates the 6 th century B.

[illegible] 6 × 17 monolithic columns (fig. 146). It shows these so close-

been found, since this appeared later from the East in the sequence of the use of marble. (See Th. Wiegand. p. 232, 233).

The greatest and most fortunate period, Corinth recorded under the tyrants (652-582 B.C.), and in this must be placed the erection of the great Doric Temple. Formerly a peripteral structure with 6 × 15 columns, those of the facade having larger diameters than those of the sides. (5.64 to 5.41 ft.). Seven of these yet stand, connected by architraves 12.53 ft. long, that still exhibit the taenia and regulas. The capitals project strongly, have a thin abacus, three annulets without coves and three incisions at the necking. The shafts exhibit 20 flutes, are slightly diminished and have no entasis. Built of poros limestone, the surfaces have a yellowish-red coating of stucco.

It belongs to the heaviest of all Grecian temples.

With similar heavy proportions is the very archaic Temple in Tarentum, that may be placed in the first half of the 6 th century. The columns were originally 27.78 ft. high, with lower diameters of 6.23 ft. and upper ones of 5.08 ft., spaced 12.20 ft. between centres, and having 24 flutes. The abacuses leave between them a space of but 3.35 ft.

To the same early period -- end of the 7 th or beginning of the 6 th century -- may be referred the Olympeion in Syracuse,[1] of which there are now but two monolithic columns with 16 flutes, which start from a plain band above the stylobate. Of this were found painted terra cotta coverings on the cornice and the cyma, that were necessary for the coarse and porous shell limestone.

*Note 1. See Paoli Orsi. L'Olympeion di Siracusa. Monumenti antichi. Rome. 1903.*

The massive remains of the very ancient hexastyle Doric peripteral structure with a builder's inscription on the stylobate -- the Temple of Apollo on Ortygia (Syracuse) -- must be placed here. Cavallari-Holm would even refer the building back to the 8 th century B.C.; on the contrary, the character of the letters on the stylobate indicates the 6 th century B. C. Likewise a great Doric peripteral structure with properly 6 × 17 monolithic columns (Fig. 146), it shows these so closely spaced, that their lower diameters are greater than the d

divergences between the columns, whereas the interrelationships vary so much, that they attract the most diverse speculations for solving the question of the treatment of the triglyphon itself, if indeed this exists. There was neither fixed of the number of the columns more than a little these, but on the contrary a single architrave block still rests on the columns, crowned by a dentilated frieze, but without mentions and triglyphs. Let's above the possibilities of the arrangement of the triglyphs, of which that with the elongated metopes is the least probable.

5. Ellaway and S. Fourdrain (c. 30) place in the 8 th century B.C. the temples in the Doorian colonies, especially the most ancient in Syracuse and in Selinus. At the place first named are the so-called Tavole Palatine and the Temple of Apollo (Chiesa di Dassone), in the latter being the so-called antis -- the archaic successive building and the so-called temple of Demeter, the archaic successive building.

At the Temple of Apollo (Tavole Palatine), the plan has not been fully uncovered, yet 15 columns still stand on the western front and 7 on the eastern side, with axial distances of 5.30 to 5.70 m. Many flutes cover the shafts of the columns, which are composed in rings of unequal heights, and their entasis is small, but considerable. The architrave is only preserved in its lower course, as well as the triglyphs and metopes. Further the upper course consisted of a frieze with reliefs and cornice or a cyma. The reconstruction with metopes is more probable. Related forms occurs from the Selinus and Cori were already discovered by Lo Re [illegible].

The Temple of Apollo is more preserved than the preceding. But little is now to be seen of the foundations, and no stone of the superstructure rises above the ground. Judging from the middle foundations, we have to do with a two-aisled cell. The columns have 20 flutes, and the capital resembles that of the Doorian Temple at Cori. Remains of stucco on the stone indicate frequently repairs. On one even being four over each other, that were successively applied on the porch foundations. Dates in 7 lines are found: the upper course of the architrave

distances between the columns, whereas the intercolumniations vary so much, that they afford the most diverse suggestions for solving the question of the treatment of the triglyph frieze, if indeed this existed. There was neither found of this nor of the cornice more than a little piece, but on the contrary a plain architrave block still rests on the columns, crowned by a chamfered taenia, but without regulas and drops! Fig. 146 shows the possibilities of the arrangement of the triglyphs, of which that with the elongated metopes is the least probable.

R. Koldewey and O. Puchstein (p. 85) place in the 6 th century B.C. the temples in the Achaian colonies, especially the most ancient in Metapontum and in Paestum. At the place first named are the so-called Tavole Paladine and the Temple of Apollo (Chiesa di Sansone), in the latter being the so-called Basilica -- the archaic enneastyle building and the so-called Temple of Demeter, the archaic hexastyle building.

Of the Temple outside Metapontum (Tavole Paladini), the plan has not been fully uncovered, yet 10 columns still stand on the western facade and 5 on the eastern side, with axial distances of 8.82 to 8.88 ft. Twenty flutes cover the shafts of the columns, which are coursed in drums of unequal heights, and their entasis is small, but perceptible. The architrave is only preserved in its lower course, as well as the triglyph frieze and cornice. Whether the upper course consisted of a taenia with regulas and drops or a cymatium is uncertain. The cornice with mutules is made probable. Painted terra cottas from the ceiling and roof were already discowered by Duc de Luynes.

The Temple of Apollo is worse preserved than the preceding. But little is now to be seen of the foundations, and no stone of the superstructure rises above the ground. Judging from the middle foundations, we have to do with a two-aisled cell. The columns have 20 flutes, and the capital recalls that of the Grecian Temple at Pompeii. Remains of stucco on the stone fragments frequently remain, on one ewen being four over each other, that were successively applied on the poros limestone. Cramps in H form are found; the upper course of the architrave

must be assumed to be a Doorian one, as is Preston.-- "according to the representations, that we have obtained from the Doric Doriam". The triglyphs are of composite shape: rectangular terra cotta, that were employed on the ceiling and roof, have been found in great numbers, even with the copper nails by which they were fastened. Koldewey and Puchstein (p. 4) mention these red slabs; already had Durm (Baukunst I, p. 179) said, "that the mode of fastening these coverings on wooden has been made clear by the piece in Metapontum. The numerous still existing terra cotta boxes, decorated by reliefs and painting, are 1.15 ft. high and exhibit square holes in the sides, through which copper (not bronze) nails were driven [illegible] in some holes. A great number of such, that accurately fit in the holes, were preserved in the glass cases of the [illegible] division of the Museum in Naples; they all measure 3.15 ins. in length, are square with square heads. Moreover and size of the nails leave the former fastening in wood [illegible] are have traces of mortar on the backs, but show the entirely clean terra cotta surface, then decide that these were only employed on wood", - - - "but meanwhile it is also our opinion (Koldewey and Puchstein), that the boxes come from the covering of the beams of the portico ceiling. The must not then exclusively place in the same category of terra cotta coverings so commonly found, as Koldewey and his associates have done, and the assumed Doric coverings are limited to the very archaic period of the Doric style".

If the widely distributed "cake-like" Doric capitals in Tarentum, Syracuse and Metapontum, as well as those in the mother country at Athens, Delphi and Corinth, be assumed as characteristic of the first period of the origin of the stone temple, then is the existing stone structure of the temple at Olympia also to be placed in that period.

The similarly shaped column capital should be assumed as the oldest made for the building among the different types that there found, and the age of the Temple be determined according

must be assumed to be a Lesbian cyma, as in Paestum,-- "according to the representations, that we have obtained from the Achain Dorism". The triglyphs are of peculiar shape; varicolored terra cottas, that were employed on the ceiling and roof, have been found in great numbers, even with the copper nails by which they were fastende. Koldewey and Puchstein (p. 40) mention these and state; already had Durm (Baustile I, p. 129) said, "that the mode of fastening these coverings on woodwork has been made clear by the piece in Metapontum. The numerous still existing terra cotta boxes, decorated by reliefs and painting, are 1.10 ft. high and exhibit square holes in the sides, through which copper (not bronze) nails were driven into the woodwork to be covered. Bent copper nails yet remain in some holes. A great number of such, that accurately fit in the holes, were preserved in the glass cases of the so-called Museum in Metapontum, and they are now in the prehistoric division of the Museum in Naples; they all measure 5.12 ins. in length, are square with square heads. Metal, form and size of the nails leave the former fastening in wood without doubt; likewise the fact, that the terra cottas nowhere have traces of mortar on the backs, but show the entirely clean terra cotta surface, then decide that these were only employed on wood", - - - "but meantime it is also our opinion (Koldewen and Puchstein), that the boxes come from the covering of the beams of the portico ceiling. One must not then exclusively place in the same category of terra cotta coverings so commonly found, as Dörpfeld and his associates have done, and the assumed cornice coverings are limited to the very archaic period of the Doric style".

If the widely distributed "cake-like" Doric capitals in Tarentum, Syracuse and Metapontum, as well as those in the mother country at Athens, Delphi and Corinth, be assumed as characteristic of the first period of the origin of the stone temple, then is the existing stone structure of the Heraion at Olympia also to be placed in that period.

The similarly shaped column capital should be assumed as t the oldest made for the building among the different types t there found, and the age of the Temple be determined accordi

accordingly. On the shafts of the columns of unequal diameters the number of flutes is 20, but only 16 on one of these. The architrave, frieze and cornice are entirely wanting. The building material consists of a coarse conglomerate; the stonework was covered by a stucco coating, and the roof with terra cotta tiles. [1] Two of the ancient fallen stone columns have been again rebuilt by the means of a German gentleman, and thus give a better conception of their esthetic effect. (Fig. 361).

*Note 1. See olympia, the results of excavations instituted by the German empire, edeted by E. Curtius and F. Adler. Berlin. 1892. Vols. 1 and 2 of plates. Gable acroterias of painted terra cotta 8.69 ft. diameter, antefixas, covering plates, drip plates; Paltes 115, 116. Wol. 2. Other cornices, antefixas, drip tiles with water spouts, cymas etc., represented on Plates 118, 119, 120, 122 and 123 -- all in vol. 2.*

Of the Temples at Paestum, the archaic enneastyle building (Basilica) and the hexastyle structure (Temple of Demeter) a are to be placed here, "as examples of the variety and freedom of the Doric style in the 6 th century B.C." As the older of the two may pass the Temple with 9 × 18 columns with a two-aisled cell, which rises on a substructure of two steps and a stylobate course, with a height of 1.23 ft. (See Koldewey-Puchstein. plate 2).

Dovetail cramps on the corner blocks of the stylobate and a lack of all visible curvature of the steps are proved, as one such at the Heraion appears to have been merely caused by sinking. The columns are 4.79 ft. diameter and have 20 flutes on strongly diminished shafts with entasis, that are built of drums of unequal heights. It is there notable, that for some capitals of columns the abacus is of ordinary hard limestone, the echinus entirely of marble, and the astragal is of soft sandstone, an alternation in material, that is also carried out in other structural parts of the two temples. The soft sandstone throughout suffered more from weathering than the hard travertine, but this indeed only occurred when the temple had lost its equalizing and protecting stucco coating. It is to be mentioned as a peculiarity, that the leaves of

the capital terminate within the hollow and exhibit on the 2
[illegible] [illegible] [illegible] [illegible] [illegible]
kind a [illegible], [illegible] [illegible], on the contrary being a
band with lotus leaves, rosettes or interwoven bands.

The architrave consists of two parts in height, the upper
one being of soft sandstone and moulded on both sides, thus
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
in Kolkewey and Pumaterem. Of the friezes, only the inner
and entirely plain course remains in some places. Now the
cornice was treated, whether with an arrangement of mutules
and vias or with a coffered slab, as on the temple of Dendera,
must now remain indeterminate. Peculiar is also the arte of
square section with the strongly projecting cavetto capital,
which with great diminution and entasis on all four sides is
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
and book cramps occur there. On the stylobate, plinth slabs
again stand on edge, supported by the sphinxes of the wall.
Pediment and roof are gone, yet there some remains of the
latter occur. Of arrangements for raising, there may be seen
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
book cramps of the antae are to be mentioned the are cramps
on the northeast angle and the decorated cramps on three out-
er corners of the stylobate. (Fig. 108 and p. 16 in Pumaterem).
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
ata has broad margins and is triangular and not very deep.

The ancient hexastyle building with 6 × 12 columns on a sty-
lobate of 2 steps is reconstructed and in form a distinct ad-
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
this a part of the friezes, cornice and architrave, the columns
and the stylobate. The mode of connection in this part is giv-
en in Fig. 26, after the representation by Puchstein and the
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
ts. between centres, and show the type of the before mention-
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
entasis, 20 flutes and a swelled capital deeply undercut at
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

the capital terminate within the hollow and exhibit on the e echinus a round between two astragals, or beneath the hollow have a round, leaves freely recurved, on the echinus being a band with lotus leaves, rosettes or interwoven bands.

The architrave consists of two parts in height, the upper one being of soft sandstone and moulded on both sides, thus lacking the regulas with drops.(Fig. 139, and Fig. 10, p. 15 in Koldewey and Puchstein). Of the frieze, only the inner and entirely plain course remains in some places. How the cornice was treated, whether with an arrangement of mutules and vias or with a coffered slab, as on the Temple of Demeter, must now remain indeterminate. Peculiar is also the ante of square section with the strongly projecting cavetto capital, which with great diminution and entasis on all four sides is designated by Puchstein (p. 16) "as a faithful translation of the column to a square plan". Raised surfaces on the abacuses and hook cramps occur there. On the stylobate, plinth slabs again stand on edge, succeeded by the ashlars of the cell. Pediment and roof are gone, yet terra cotta remains of the latter occur. Of arrangements for raising, there may be seen the U-shaped rope-grooves on the end surfaces. Besides the hook cramps of the antes are to be mentioned the axe cramps on the northwest angle and the decorated cramps on three other corners of the stylobate.(Fig. 108 and p. 15 in Puchstein). The sinking on the end surfaces of the ashlars of the stylobate has broad margins and is triangular and not very deep.

The ancient hexastyle building with 6 × 13 columns on a stylobate of 2 steps is "technically and in form a distinct advance,"-- of which there yet stands the pediment and beneath this a part of the frieze, cornice and architrave, the columns and the stylobate. The mode of coursing in this part is given in Fig. 25, after the representation by Puchstein and the dimensions of Labrouste. The columns stand at 8.66 to 8.54 ft. between centres, and show the type of the before mentioned Basilica, with the strongly diminished shaft with slight entasis, 20 flutes and a swelled capital deeply undercut at the hollow. On the architrave the upper member is again made of sandstone as a cyma on both sides; the frieze has singularly

inserted triglyph slabs, recalling the construction of the [illegible]

[illegible] is known, [illegible]

accessories of the architrave and frieze, with unusual dimensions in height, the weight of these and of the [illegible] is transferred in the best way to the supports, although [illegible] the architrave too much. The construction is original and well considered, but not without later correction. The triglyphs are made of a softer kind of stone. The cornice is in the form of coffered slabs with stepped sinkings and very certainly remains in place above the columns, and it was proved to be of the same form on the longer sides by the finding of a coefficient angle block by Koldewey-Puchstein. (Fig. 68 in the text). The joints for the planes of the ridge and inclined planes portions of the roof may still be recognized, as well as the cramps and dowell holes. The sinkings in the joint planes have broad margins and moderate depth. The exact difference of 0.44 ft. in the dimensions of the eight angle metopes in contrast to the normal (2.79 to 2.85 ft.) suggests an intentional ignoring of the necessity of a possible uniformity of the metopes on the part of the architect. "Where [illegible] difference is to be avoided on principle, and absolute axial uniformity on all sides is to be produced." An axial contrast of the angle triglyph with a half metope, as Dörpfeld still recommends, is to be avoided.

Aeolic Doric in its last phase just before the best period is shown by the Greek Temple in Cumae, [1] of whose early Greek stylobate only a small block now lies beneath the two drums of columns in place on the north side. The upper step is almost entirely wanting; only on the northwest angle still lie some of its ashlars. The sinking of the base is deep and with broad margins. The two drums of column still standing have 16 flutes, roughed out in the surface and once covered by stucco, consisting of a lower course and of a polished coarse-grained upper course of stucco marble. The four remaining capitals are of Sarno limestone, recalling in their form those of the Tavole Palatini at Metapontum, their surfaces being likewise roughed to receive stucco. The measured axial distances give a distance of 8.22 ft. without any re-

inserted triglyph slabs, recalling the construction of the ancient Hekatompedon in Athens, whereby with the thoughtful stonecutting of the architrave and frieze, with unequal dimensions in height, the weight of these and of the tympanum wall is transferred in the best way to the supports, without loading the architrave too much. The construction is original and well considered, but not without later correction. The triglyphs are made of a softer kind of stone. The cornice is in the form of coffered slabs with stepped sinkings and yet partly remains in place above the tympanum, and it was proved to be of the same form on the longer sides by the finding of a pediment angle block by Koldewen-Puchstein.(Fig. 22 in their work). The gains for the places of the ridge and intermediate purlins of the roof may still be recognized, as well as axe cramps and dowell holes. The sinkings in the joint planes have broad margins and moderate depth. The great difference of 0.89 ft. in the dimensions of the eight angle metopes in contrast to the normal (2.79 to 3.68 ft.) suggests an intentional ignoring of the necessity of a possible uniformity of the metopes on the part of the architect. "Every axial difference is to be avoided on principle, and absolute axial uniformity on all sides is to be produced." An axial position of t the angle triglyph with a half metope, as Delagardette still represents, is to be avoided.

Archaic Dorism in its last phase just before the best period is shown by the Greek Temple in Pompeii, [1] of whose early Grecian stylobate only a small block now lies beneath the two drums of columns in place on the north side. The upper step is almost entirely wanting; only on the northeast angle still lie some of its ashlars. The sinking of the beds is deep and with broad margins. The two drums of columns still standing have 18 flutes, roughed out in the surface and once covered by stucco, consisting of a lower course and of a polished coarse-grained upper course of stucco marble. The four remaining capitals are of Sarno limestone, recalling in their forms those of the Tavole Paladini at Metapontum, their surfaces being likewise roughed to receive stucco. The measurable axial distances give a distance of 8.33 ft. without any re-

reduction for the angle spaces. Otherwise some valuable brightly painted terra cottas from the roof were found -- pieces of the cyma with unperforated lions' heads and anthemion ornament.

*Note 1. Se F. von Duhn & L. Jacobi. Der Griechische Tempel in Pompeii. Heidelberg. 1890.*

Of the group of temples in the Doric colonies, according to those mentioned at Tarentum, Syracuse, Metapontum, Paestum and Pompeii, it is especially those of **Selinus** on which men are agreed as to their chronology on account of the accurate work of Otto Benndorf, so far as this concerns the peripteral temples built before 409 B.C.

From a very ancient time dates Temple C, after this being Temple D, somewhat later Temple F, and finally Temple G, that was at least begun in this period.

But still absolutely accurate dates for the erection of the temples mentioned are not fixed, or still only on the basis of the date for the founding of Selinus, i.e., 628 B.C. The oldest of the said temples we must indeed place at the middle of the 6 th century, in the time of the greatest activity in stone construction.

Temple C, a peripteral structure of 6 × 17 columns and with a very long and narrow cell was the most important one on the acropolis. The spacings on the longer side are equal and average 12.66 ft., those of the facade being 14.46 ft. on the other hand. The six columns of the eastern facade and the adjacent eight on the southern side are monolithic, the others being composed of drums of unequal heights. Most have 16 flutes, others 20, that end in the hollow of the capital, but which were also extended in stucco through this to the annulets, of which another example remains on the Temple of Hercules in Akragas; their diminution is moderate, and an entasis does not exist. The material as well as for the entablature consists of fine limestone tufa, which was quarried a few miles north of Selinus.

Guiding dowells for the drums are proved.

On the architrave the strongly projecting taenia bears in the middle of the front surface a flat sunken round and a low regula with inclined face, on which are 6 free drops. On the

pyramidens en [illegible] fram on its face the remains of stucco. The grooves of the bridges are bordered, and according to Baldewey-Puchstein (Fig. [illegible]), with reference to the marble tri-lith exhibited in the Museum at Palermo, they are and in front and deeply undercut. The head enclosing the inclosure follows the semicircular form on one side of the triclinium, while on the other side it is round inside and externally an ogive curve. The limestone enclosed exhibits a porous surface; the edges are partly broken and destroyed. This fact must have led Gwalliari to the "reconstruction" of the pointed arch (Fig. [illegible]). But what Puchstein gives as a pointed arch is an ogee or recurved arch. The form of the pointed arch would in itself be no parity. By one observation would lead to the recurved arch as the out form. What the stucco-worker finally made of it, we do not know. In any case the pointed arch is not the final word and at the same time is without [illegible].

The equality of the axial divisions influenced uniformity in the subdivision of the terraced friezes; the mutule cornice exhibits uniform mutules with 3 × 3 drops and wider ones over the triglyphs with 3 × 5 drops. Above there was further dia-[illegible] and extended horizontally across the entire building, while a mutule underneath ceases. Likewise with terra cotta slabs; that again confined 1.31 fr. beyond the trumeau, formed the [illegible] in accordance with the horizontal cornice on the pediment. Thus the terra cotta were lower on the pediment than at the sides, and the pediment cornice had the same level, that the Temple of Jupiter at Pessinus makes credible, and which also occurs on some Etruscan rock-cut tomb fronts of the ancient native style. Over the inclined cornice must have been a complete cover. The ending at the joints is round and some edged; 4 cowsils and crenes do not occur on the building, and for sel-[illegible] arrangements is only the provision of a double groove for a rope on the end surfaces and ends. Wor the restoration attempted by Baldewey-Puchstein (Fig. 129 in their work), a part of which is given in Fig. 3[illegible], it may be repeated, that

architrave are also found on its face the remains of stucco. The grooves of the triglyphs are bordered, and according to Koldewey-Puchstein (Fig. 74), with reference to the angle triglyph exhibited in the Museum at Palermo, they end in found form and deeply undercut. The band enclosing the incisions follows the semicircular form on one side of the triglyphs, while on the other side it is round inside and externally an ogee curve. The limestone employed exhibits a porous surface; the edges are partly broken and destroyed. This fact must have led Gavallari to the "representation of the pointed arch" (Fig. 363). But what Puchstein gives as a pointed arch is an ogee or recurved arch. The form of the pointed arch would in itself be no rarity. My own observations would lead to the recurved arch as the cut form. What the stucco-worker finally made of it,we do not know. In any case the ending now shown is not the final word and at the same time is without meaning.

The equality of the axial divisions influenced uniformity in the subdivision of the triglyph frieze; the mutule cornice exhibits narrow mutules with 3 × 3 drops and wider ones over the triglyphs with 3 × 6 drops. Above these was further placed an ashlar course, that was covered by terra cotta boxes and extended horizontally around the entire building, while a simple undercut course, likewise with terra cotta slabs, that again projected 1.51 ft. beyond the tympanum, formed the pediment cornice, whose front surface was about 1.57 ft. high, in agreement with the horizontal cornice on the pediment.Thus the terra cottas were lower on the pediment than at the sides, and the pediment cornice had the same bend, that the Temple of Demeter at Paestum makes credible, and which also occurs on some Phrygian rock-cut tomb facades of the ancient native style. Over the inclined cornice must have been a complete cyma. The sinking at the joints is round and sharp edged; d dowells and cramps do not occur on the building, and for setting arrangements is only the provision of a double groove for a rope on the end surfaces and beds. For the restoration attempted by Koldewey-Puchstein (Fig. 178 in their work), a part of which is given in Fig. 363, it may be repeated, that

from a technical standpoint the element must be termed a fail-
ure, and that mostly requires its consequence. Starting wol-
ds for it nowhere exists, the block a b c d e must first be
loosed, and inserting the triangular piece e f g, that fortune
in the chosen arrangement would project beyond the smooth
frieze band also by the thickness of the moulding.(Fig. 5a).

Temple 5 was a great ancient Doric peripteral structure
with 8 x 18 columns on a stylobate of 3 steps, with axial dis-
tance of 14.50 ft. on the facade and of 14.30 ft. on the side.
The shafts of the columns consist of drums of unequal heights
and have 20 flutes, those of the columns of the pronaos on t
the contrary having but 16 with moderate diminution and ani-
ent entasis. The surfaces of the stones were covered with
stucco. The flutes were interrupted by the hollow of the con-
tact. The drums of the regula bore first the front surface
of the [illegible]
metopes also exhibit a white coating of stucco.

The triglyphs are as wide as the metopes, so that the diffi-
culty of the triglyph at the corner is avoided. The corniche
bears mutules and arde mutulae, like Temple 6. The inclined
cornice is decorated plane and is recessed from three, the in-
ermost band always against a second.

According to the fragments found and the remains of color
on both temples 5 and 6, Pausanias comes to the conclusion
(c. 120), "that on these ancient buildings the white stucco
was employed only on those parts, which were not painted, and
once chiefly on the larger surfaces of the architrave, metopes,
and the like". And on the shafts of the columns, the capitals
and the cell walls should be added. The roof appears to have
been covered with tiles of fine limestone with square edges.
Instead of the sober usual elsewhere, we find columns in the
pronaos.

Temple 6 in Selinus was a great ancient Doric peripteral t
emple with 6 x 14 columns, with stone enclosures between
them, and built on a stylobate of 3 steps. Remains of stucco
and of color are also discovered here. The shafts are made of
several drums and with strong diminution, but remained without
entasis. Twenty flutes surround the shaft and terminate in

from a technical standpoint the attempt must be termed a failure, and that nothing requires its acceptance. Starting points for it nowhere exist, the block a b c d e must first be found, and likewise the triangular piece e f g, that further in the chosen arrangement would project beyond the smooth frieze band slab by the thickness of the moulding.(Fig. 365).

Temple D was a great ancient Doric peripteral structure with 6 × 13 columns on a stylobate of 4 steps, with axial distances of 14.33 ft. on the facade and of 14.80 ft. on the side. The shafts of the columns consist of drums of unequal heights and have 20 flutes, those of the columns of the pronaos on t the contrary having but 16 with moderate diminution and slight entasis. The surfaces of the stones were covered with stucco. The flutes were intersected by the hollow of the capital. The drops of the regula hung free; the front surface of the architrave was likewise covered by stucco, just as the metopes also exhibit a white coating of stucco.

The triglyphs are as wide as the metopes, so that the difficulty of the triglyph at the corner is avoided. The cornice bears narrow and wide mutules, like Temple C. The inclined cornice is undercut plane and is recessed four times, the innermost band abuts against a second.

According to the fragments found and the remains of color on both temples C and D, Puchstein comes to the conclusion (p. 109), "that on these ancient buildings the white stucco was employed only on those parts, which were not painted, and thus chiefly on the larger surfaces of the architrave, metopes, and the like". And on the shafts of the columns, the capitals and the cell walls should be added. The roof appears to have been covered with tiles of fine limestone with square edges. Instead of the antes usual elsewhere, we find columns in the pronaos.

Temple F in Selinus was a great ancient Doric peripteral b building with 6 × 14 columns, with stone enclosures between them, and built on a stylobate of 3 steps. Remains of stucco and of color are also discerned here. The shafts are made of unequal drums and with strong diminution, but remained without entasis. Twenty flutes surround the shaft and terminate in

the opening hollow of the cornice. The capital has a low abacus, a flat and slightly swelling echinus with 4 annulets, the architrave a beveled with face flows from it. Most of the metopes, even those damaged, are of two courses in height.

The corner triglyphs are modules of equal width, that has 2 grooves in front and 4 in depth. On the corona is found a groove for the overhang, which is made of fine white stone in the simple Doric order for and bears traces of painted leaves. Its lot along the sides is upright to the slope of the roof.

Of the remains of stucco and color, there are still remaining red colors on the cornice, applied directly on the stone; between the mutules and on the face of the scotia is to be a sandstone white stucco on the corona and the under surface of the scotia, on the architrave, on the capital and on the col-umns.

[illegible] Pieces fragments of terra cotta from the roof were found; in the Museum at Palermo are to be found portions of [illegible]

The mortars on all sculpture are bold and with wide margins, extending also on those of the longer sides. Dowells were n not found, and only one-second cramps at the intercolumniations.

Temple C of Apollo in Selinus was of colossal dimensions, a-mong from the Temple of Zeus in Agrigento and the Olympieion near Girgenti, being the largest in antiquity. The date of its erection is placed at the middle of the 5 th century B.C. From the metal distances [illegible] peaking a width of [illegible]

[illegible] dimensions of 3 × 17 columns with 8-sided cell, in whose middle stairs was constructed a so-called adyton.(Fig. 296; plan).

These doorways led into the three aisles of the cell, their [illegible] connected to the external columns; they bore the capital a [illegible] a cornice, flanked for 18 flutes. A smaller capital was found and leads to the interaxes of a balconnade above the lon-

the necking hollow of the capital. The capital has a low abacus, a flat and slightly swelled echinus with 4 annulets, the architrave a taenia with free drops from it. Most of the metopes, even those sculptured, are of two courses in height.

The cornice throughout has mutules of equal widths, that have 6 drops in front and 4 in depth. On the corona is found a groove for the cymatium, which is made of fine white stone in the simple Doric ogee form and bears traces of painted leaves; its top along the sides is wrought to the slope of the roof.

Of the remains of stucco and color, there are still remaining red colors on the cornice, applied directly on the stone; between the mutules and on the face of the scotia is to be m mentioned white stucco on the corona and the under surface of the scotia, on the architrave, on the capital and on the columns.

On the internal columns were traced 16 flutes, but not executed. Painted fragments of terra cotta from the roof were found; in the Museum at Palermo are to be found portions of the beautiful cyma of fine tufa belonging here, decorated by ornaments and colors.

The sinkings on all ashlars are bold and with wide margins, extending also on those of the longer sides. Dowells were n not found, and only axe-shaped cramps at the intercolumniations.

Templ G of Apollo in Selinus was of colossal dimensions, aside from the Temple of Zeus in Akragas and the Didymaeon near Miletus, being the largest in antiquity. The date of its erection is placed at the middle of the 5 th century B.C. From the axial distances, Koldewey-Puchstein reckon a width of 164.33 ft. with a length of 361.98 ft., assuming a so-called pseudodipteral structure of 8 × 17 columns with 3-aisled cell, in whose middle aisle was constructed a so-called adyton.(Fig. 365, plan).

Three doorways led into the three aisles of the cell, their columns considerably smaller, monolithic and without flutes, in contrast to the external columns; they bore the capital w with a hollow, finished for 16 flutes. A smaller capital was found and leads to the inference of a colonnade above the low-

the east has a diameter of 8.82 ft., a polygonal one in the
produces a difference of 3.32 to 3.72 ft. from each corner.

in the facades and sides of 24.82 and 21.72 ft.

The triglyphs were wrought in one piece and have two rows
lower and two smaller upper blocks with a simple band cap.
from metopes about 2.24 ft. from the foreground, that has
from metopes with 8 × 8 drops. The use of axe champs (coup-
le dovetail) is established. The height of the columns for
and by Sarre at Baiae at even 58.24 ft. Goldsmey-Lusebein
of 21.29 and 21.72 ft., when they fix 21.52 ft. as the total
height of the entablature.

Is here here a procedure similar to that of the Temple of

lower one. [1]

*Note 1. Hittorf in his magnificent work (Architecture Antique de la Sicile. Pl. 70-74. Paris. 1870) attempts a restoration for the interior with 2 and 3 colonnades over each other; once assuming a skylight in the manner of the atrium of the antique dwelling, and the other time he prefers high side light beneath a hypaethrum, thus erecting anothe small colonade above the middle aisle, which supports an internal roof. Both assumptions are more interesting than fortunate.*

Differing from the archaic architecture is that of the opisthodome. That of the former exhibits archaic swelled capitals with hollows and separate forms of antes, those of the latter being fully developed stone capitals without hollows and regular Doric antes -- so that the eastern part is built in the ancient archaic style, the western facade being in the fully developed Doric, whereon many parts have not passed beyond the stage of preliminary work. A completely fluted column in the east has a diameter of 8.53 ft.,a polygonal one in the west having one of 11.48 ft. on the other hand, which thus produces a difference of 2.62 to 2.79 ft. from each other. From the diversity of the capitals, three types come under consideration, which A. Holm determined for the first time. (1871),(Koldewey and Puchstein, p. 124) with axial divisions on the facades and sides of 21.39 and 21.72 ft.

The triglyphs were wrought in one piece and have two rope grooves on the underside; the metopes consist of one large 1 lower and two smaller upper blocks with a simple band cap. Massive blocks 9.84 ft. deep form the cornice, that has uniform mutules with 3 × 6 drops. The use of axe cramps (double dovetail) is established. The height of the columns for the peripteral colonnade is assumed by Hittorf at 53.47 ft. and by Serra di Falco at even 56.94 ft. Koldewey-Puchstein are contented with a height of 53.37 ft. for axial distances of 21.39 and 21.72 ft., when they fix 21.65 ft. as the total height of the entablature.

We here have a procedure similar to that at the Heraion at Olympia, where with columns of uniform height the diameters of the columns differ strikingly, as well as the profiles of

the capitals. In such great undertakings [illegible] those of long duration, men have not hesitated to make [illegible] by the appearance of that already executed, have ceased trea[illegible] not be archaic in a dull way." Did not in our mediaeval cathedrals the Gothic and the Romanesque proceed in the same manner, [illegible] preceding styles!

All columns with the oldest forms of capitals indeed belong to the pronaos facade (except that for two in the series the capitals could no longer be found), the same capitals on corresponding shafts were borne by the columns of the entire right side and of about one half the left side, the remainder [illegible] bear the capital designated as the middle form, while the oth[illegible] uniformly executed in accordance with the old canon, the left side had half its columns according to the older and half after the middle canon, those of the opisthodome facade being after the modern, where the two angle capitals are further designated as no longer to be determined. And thus must be taken with the colossal building!

With the deep pronaos, a single middle doorway did not suffice to light the interior, even if this be assumed to be 25.15 ft. wide and 52.13 ft. high; the architect then also [illegible]

[illegible] Paestum and Metapontum, with many others. First is to be reckoned first in this case is the architrave, sculptured with figures, on which the regulas of the frieze are without drops, [illegible]

the capitals. In such great undertakings and especially for those of long duration, men have not hesitated to make concessions to a changed taste -- the new fashion -- and undisturbed by the appearance of that already executed, have placed themselves on the standpoint:-- "We do this better today and will not be archaic in a dull way." Did not in our mediaeval cathedrals the Gothic and the Romanesque proceed in the same manner, and even the Renaissance in its last phases, with the two preceding styles?

All columns with the oldest forms of capitals indeed belong to the pronaos facade (except that for two in the series the capitals could no longer be found), the same capitals on corresponding shafts were borne by the columns of the entire right side and of about one half the left side, the remainder of which, including the angle column of the opisthodome facade, bear the capital designated as the middle form, while the others and the two capitals of the opisthodome exhibit the modern form. Thus only the pronaos facade and the right side were uniformly executed in accordance with the old canon, the left side had half its columns according to the older and half after the middle canon, those of the opisthodome facade being after the modern, where the two angle capitals are further no designated as no longer to be determined. And that must be taken with the colossal building!

With the deep pronaos, a single middle doorway did not suffice to light the interior, even if this be assumed to be 13.12 ft. wide and 52.16 ft. high; the architect then added two others, somewhat smaller for the side aisles, whereby indeed a hypaethrum became superfluous.

The archaic Doric peripteral Temple on the Aeolic coast, that by J. Th. Clarke [1] is dated 479 B.C., contrary to the e earlier assumptions, likewise exhibits a certain uncertainty in the detail forms, like the before mentioned temples at Paestum and Metapontum, with many others. First is to be reckoned first in this case is the architrave, sculptured with figures, on which the regulas of the frieze are without drops, as well as the mutules of the cornice, which are likewise left without drops.

Note 1. See report of investigations at Lagos in [illegible]
[illegible] p. 414. Paris, 1844. M. [illegible], [illegible]
[illegible] 1861.

Another in the Gymnasium of Tyre, on [illegible]
[illegible] is similar marks for temples with a rectangular
portico of 8 × 12 columns, that are spaced 7.92 and 5.08 ft.
between centres with a height of 15.42 ft. The shaft is sup-
ported by 16 flutes, the material [illegible]
anic stone, a trachyte of dark color, that indeed was covered
by stucco.

Contrary to Texier's plan, the temple is now represented,
when measured on the upper step, as a plain ante-temple 45.91
ft. wide and 92.42 ft. come with peristeral colonnades (alli-
[illegible]
bare U-shaped grooves for the hoisting ropes, and also iron
[illegible]
anchors of the sashes, are wrought with borders. Both the
chain and the sculptured metopes were inserted in grooves in
the triglyphs. The covering tiles were of terra cotta. The
recently found sculptures of the entablature are now exhibit-
ed in the Museum in Constantinople; others are in the Louvre
in Paris.

The Doric stone temples from the beginning of the 6 th cen-
tury to the works of the best period in Athens, mentioned un-
der II, both in the mother country and in the colonies, are
not all of the same material, even in the same building, like
the poros architecture on the Acropolis of Athens, and as
shown by the Temple of Apollo at Delphi, built by Trophonios
and Agamedes in 570-548 B.C.(which was described by Pausanias
[illegible]
in 373 by an earthquake. Painted remains thereof in Parian
marble were found in the French excavations built into the
[illegible]
[illegible]
Limestone, travertine, and also trachyte, taken from the im-
mediate vicinity of the building, employed for building pur-

*Note 1. See Report of Investigations at Assos in 1881. Boston. 1882. p. 215. pl. 8; Also (Fig. 358). F. Adler. Die Ausgrabungen in Assos. Berlin. 1882.*

According to the statements of Texier, an increased arrangement of steps is carried across the facade with a peripteral portico of 6 × 13 columns, that are spaced 7.22 and 8.03 ft. between centres with a height of 15.42 ft. The shaft is surrounded by 16 flutes, the material employed consists of volcanic stone, a trachyte of dark color, that indeed was covered by stucco;

Contrary to Texier's plan, the temple is now represented, when measured on the upper step, as a plain ante-temple 46.91 ft. wide and 99.48 ft. cong with peripteral colonnades (allied to the middle city Temple in Selinus). The ashlars of the lower steps still have the setting bosses, the cornice blocks have U-shaped grooves for the hoisting ropes, and also iron clamp-bands; the drums of the columns, as well as the joint surfaces of the ashlars, are wrought with borders. Both the plain and the sculptured metopes were inserted in grooves in the triglyphs. The covering tiles were of terra cotta. The recently found sculptures of the entablature are now exhibited in the Museum in Constantinople; others are in the Louvre in Paris.

The Doric stone temples from the beginning of the 6 th century to the works of the best period in Athens, mentioned under II, both in the mother country and in the colonies, are not all of the same material, even in the same building, like the poros architecture on the Acropolis of Athens, and as shown by the Temple of Apollo at Delphi, built by Trophonios and Agandes in 530-514 B.C.(which was described by Pausanios as completed in 330 B.C.) after the ancient one was destroyed in 373 by an earthquake. Painted remains thereof in Parian marble were found in the French excavations built into the foundation), the Heraion at Olympia, the two archaic temples at Paestum, Metapontum and others.

Where uniform materials came into use, we see porous shell limestone, travertine, and also trachyte, taken from the immediate vicinity of the building, employed for building purpo-

purposes, thus for the Temple in Corinth, ., together with the Achaian, Chilcidic and Doric colonies in Sicily and lower Italy (Tarentum, Syracuse, Metapontum, Pasetum, Selinus, Akragas, Egesta, etc.). All these temples without distinction were covered by more or less fine stucco marble and painted, then the structural elements are mostly left white, the ornaments and figures being in the well known heraldic colors, blue, y yellow, red, green and black; the figures rose in light colors from a dark ground (red or blue). The entire stone construction disappeared, even the most careful fitting of the joints etc., together with many failed experiments in stonecutting, like the irregular and unequal heights of the drums of columns, beneath the concealing coating of stucco and color.

Likewise appearing imperfect to us many details, annulets, cymas, fillets between flutes, incisions and the like, were refined and shaped by stucco as done today, frequently being merely the preparation for a finely conceived artistic form, and they must be judged in this sense. By the coating of stucco and color also disappeared the different materials employed on the same building; for this was only possible a uniform tone effect of the architecture.

That with this mode of construction -- ashlar work with a coating of colored stucco -- repairs or restorations were frequently necessary on the exterior, especially for exposed portions of buildings, as for example on eave cornices, that had to resist the entire effect of weather, over which the rainwAter flowed, indeed requires no further statement. This evil was palliated by the use of weather resisting arrangements f for protection, painted and hard burned terra cotta boxes and plates on the porous stone cornices and the wooden beams of the portico ceiling. In place of the perishable material appeared a more monumental one -- burned clay -- that always tells us what the crystalline limestone and other dense kinds of stone had long refused to do. On the Treasury of the Geloans at Olympia, on the two archaic temples at Metapontum, on the temples at Selinus, they are proved and have remained to us, fastened on the stone cornices and wooden beams by metal pins and long copper nails. With the variegated clay tile

[illegible] a criterion of the buildings of this period.

The [illegible] are now mostly tinted a golden brown in quiet and [illegible] grandeur, animating the landscape in a passive way, or [illegible] in the midst of modern everyday life and among its [illegible] and impersonal structures, they affect the nerves of the [illegible] observer of today differently, and influence sensuous [illegible] more strongly indeed, than the formerly gaily [illegible] buildings would do, that reflect joy in color of [illegible] of the eastern nations. The pebbly stone of the Temple of [illegible] and Doric near Agrigento with its colored stucco covering [illegible] challenges reflection -- The compositions of the "beautiful" are even subject to change!

[illegible] are yet to be found in the frequently monolithic and heavy [illegible] of [illegible] "[illegible]-like"[illegible] capitals with the in[illegible] [illegible] plain or leaf-adorned bolster at the transition from column to the shaft of the column, in the flutes of the shaft [illegible] not always carried to the stylobate, after the Egyptian proto[illegible] (which further occurs but occasionally), whose number varies from 16 to 24, in the absolute verticality of the columns, in the usually convexing and reduced stylobates; then in the [illegible] of sculptures in relief on the face of the architrave, in the uncertainty of form and number of frieze on the pedimental and the mouldings, as well as in the inequality of the latter, -- wide and narrow alternating -- from 4 to 7 on the frieze, on the latter frequently but two rows in depth, or even the complete absence of the mouldings and vice.

As a peculiarity or an uncertainty in this period must also be the omission of the metopes and drops and the plain band (taenia) above the architrave designated generally, as well as their reinsertion by a cove with or without ornaments. Likewise the prominence of the band without drops on the architrave recommended by sculptures is to be placed here. And what must be regarded as more striking is the entire arrangement mostly outside the lines of other early Grecian structures, the occurrence of the cottered pediment and eave cornice slabs,

roof and its acroterias, antefixas, ridge and eave tiles,they form a criterion of the buildings of this period.

The ruins are now mostly tinted a golden brown in quiet and simple grandeur, animating the landscape in a passive way, or prominent in the midst of modern everyday life and among its art and industrial structures, they affect the nerves of the northern observer of today differently, and influence sentimental natures more strongly indeed, than the formerly gayly stuccoed sanctuaries would do, that reflect joy in color of of the eastern nations. The rebuilt angle of the Temple of Castor and Pollux near Akragas with its colored stucco covering challenges reflection -- The conceptions of the "beautiful" are even subject to change!

Further characteristics of the temples of the 6 th century are yet to be found in the frequently monolithic and heavy shafts of columns, constructed without entasis, in their widely projecting "cake-like"echinus capitals with the intermediate plain or leaf-adorned hollow at the transition from echinus to the shaft of the column, in the flutes of the shaft n not always carried to the stylobate, after the Egyptian prototype (which further occurs but occasionally), whose number varies from 16 to 24, in the absolute verticality of the colunms, in the partly occurring and reduced stylobate; then in the p placing of sculptures in relief on the face of the architrave, in the uncertainty of form and number of drops on the regulas and the mutules, as well as in the inequality of the latter, -- wide and narrow alternating -- from 4 to 6 on the former, on the latter frequently but two rows in depth, or even the complete absence of the mutules and vias.

As a peculiarity or an uncertainty in this period must also be the omission of the regulas and drops and the plain band (taenia) above the architrave designated generally, as well as their replacement by a cyma with or without additions. Likewise the prominence of the band without drops on the architrave decorated by sculptures is to be placed here. And what must be regarded as more striking is the entire arrangement wholly outside the lines of other early Grecian structures, the occurrence of the coffered pediment and eave cornice slabs,

with the best judgment possible.

Elsewhere in temples is also a touch to be noted, necessarily in the mode of preparing the end and bed surfaces of architraves and lengths of columns, even in the context of these earliest direct connection by wooden or metal cramps in detail, T and I cramps, also of axe-shaped and ornamental forms, for which cramps was employed in the earliest period, but then in the later, almost without exception, iron with cast lead.

The arrangements for holding and setting by means of U-shaped grooves in the ends of the architraves and of all parts of the entablature (architrave, frieze and cornice), the outline of straight grooves in the ends and beds of different members, their perforation for stringing on ropes, are characteristic arrangements of the period, of which the U-shaped groove on the end surfaces of great architraves was indeed learned from the Mycenaeans. (See the Mycenaean royal tombs in Sikion).

The last step in dressing and smoothing the architraves occurred after completing their setting, and this was retained later, [illegible] ment of taking down the scaffolding.

Common to all temples is only the covering of the stones without any mortar and the use of plinth slabs slightly projecting from the face of the wall, usually forming a plinth [illegible].

On the eastern facade of the Temple of Apollo at Delphi was made indeed the first attempt in architecture to apply painting without a lighter ground and directly on the white marble, which first became common with the introduction of white marble for the temples of the mother country, with the aid of gilding.

It must still be emphasized here, that just the temples, which belong to the oldest architectural works and must stand nearest to a preceding wooden style, relatively least bear vestiges of a recollection of such. Thus for example, the two very ancient temples at Paestum and at Pestum, the Parthenon at Syracuse, the Treasury of the Siciens, the Megaron of Demeter near Cerera, and the Temple in Assos remain free carpenter's work recalling wooden construction for fas-

with the bent pediment cornice.

Likewise in technics is also a touch to be noted, especially in the mode of preparing the end and bed surfaces of ashlars and drums of columns, then in the contact of these and their direct connection by wooden or metal cramps in detail, Z and U cramps, also of axe-shaped and ornamental forms, for which bronze was employed in the earliest period, but then in the later, almost without exception, iron with cast lead.

The arrangements for hoisting and setting by means of U-shaped grooves in the ends of the ashlars and of all parts of t the entablature (architrave, frieze and cornice), the cutting of straight grooves in the ends and beds of different ashlars, their perforation for slinging on ropes, are characteristic arrangements of the period, of which the U-shaped groove on the end surfaces of great ashlars was indeed learned from the Phoenicians.(See the Phoenician royal tombs in Sidon).

The last step in dressing and smoothing the ashlars occurred after completing their setting, and this was retained later, being set when the roughing was finished and at the commencement of taking down the scaffolding.

Common to all temples is only the coursing of the stones w without any mortar and the use of plinth slabs slightly projecting from the face of the wall, usually forminm a plinth without a moulding.

On the eastern facade of the Temple of Apollo at Delphi was made indeed the first attempt in architecture to apply painting without a plaster ground and directly on the white Parian marble, which first became common with the introduction of white marble for the temples of the mother country, with the aid of gilding.

It must still be emphasized here, that just the temples, w which belong to the oldest architectural works and must stand nearest to a preceding wooden style, relatively least bear v vestiges of a recollection of such. Thus for example, the t two very archaic temples at Metapontum and at Paestum, the Artemesion at Syracuse, the Treasury of the Geloans, the Megaron of Demeter near Gagera, and the Temple in Assos remain free carpenter's means recalling wooden construction for fas-

[illegible] the recovered Doric bonds (triglyphs) by beams and [illegible] (wooden ones), that only maintained and enhanced o[illegible] [illegible] in the buildings of the isolated Doric style as a fixed form, like the number and shape of the drops on the [illegible]. The structure of the Temple of Demeter in Paestum [illegible] further in this, where a direct representation of typi[illegible] [illegible] in stone is justified in both structural and formal respects, already on account of the courses [illegible] necessary for inserting the triglyphs in the form of slabs.

"II. About the middle of the 5 th century was completed a further change, that "created a single, generally current and uniformly developed style", and massive shows but slight [illegible] of the ancient different forms, with an almost absolute [illegible] of the buildings.

"[illegible] material, which with greater durability and strength permits the finest dressing of the ashlars and of the details, making the stucco coating superfluous as a protecting material for the stone and for receiving the painting, likewise there cost[illegible] for the covering of the roof and the woodwork of the ceiling of the principal portico, of the pronaos and of the opisthodomos can be omitted, and this be limited to the ceiling of the cell and the roof construction -- this is the dense crystalline limestone, the white marble of Asia Minor, of the Greek islands, particularly of Paros and from the vast quarry of Pentelicos near Athens. If we place the date of the erection of the Temple of Zeus in Olympia in the year 456 B.C., of the Temple of Poseidon at Paestum in the middle of the 5 th century, that of the Temple of Apollo on Naxos not before the year 500 B.C., the monuments of this nearly perfected stone architectural style are followed preceded by "first and prominent historical works of the Doric style, which may b serve as examples of the designed and strong architecture of the 5 th century, but in technical perfection and artistic summary in form and proportions stand far behind the buildings on the Acropolis of Athens, that are not so very removed

fastening the grooved facing boards (triglyphs) by bands and drops (wooden pins), that only undiminished and undeniably o occur first in the buildings of the declared Doric style as a fixed form, like the number and shape of the drops on the mutules. The architect of the Temple of Demeter in Paestum went farthest in this, where a direct representation of typical wooden construction in stone is justified in both structural and formal respects, already on account of the coursed stonecutting mentioned for the pediment entablature and the resulting necessity for inserting the triglyphs in the form of slabs.

III. About the middle of the 5 th century was completed a further change, that "created a single, generally current and uniformly developed style", and meantime shows but slight echos of the ancient different forms, with an almost absolute monumentality of the buildings.

It is first compelled by the introduction of a new building material, which with greater durability and strength permits the finest dressing of the ashlars and of the details, making the stucco coating superfluous as a protecting material for the stone and for receiving the painting, likewise terra cotta for the covering of the roof and the woodwork of the ceiling of the principal portico, of the pronaos and of the opisthodome can be omitted, and this be limited to the ceiling of the cell and the roof construction -- this is the dense crystalline limestone, the white marble of Asia Minor, of the Grecian islands, particularly of Paros and from the vast quarry of Pentelecos near Athens. If we place the date of the erection of the Temple of Zeus in Olympia in the year 456 B.C., of the Temple of Poseidon at Paestum in the middle of the 5 th century, that of the Temple of Aphaia on Egina not before the year 500 B.C., the monuments of this nearly perfected stone architectural style are indeed preceded by "great and prominent historical works of the Doric style, which may b serve as examples of the declared and strong architecture of the 5 th century, but in technical perfection and artistic symmetry in form and proportions stand far behind the buildings on the Acropolis of Athens, that are not so very removed

from Asia in date -- (the Parthenon in 447-438 B.C.), the "Corinthian" in [illegible], the Tholos in [illegible], the indeed little Ionic Temple of the wingless goddess (Nike Apteros; 449-421?) and the Erechtheion completed in 407 B.C.), and they must remain unique them by the advantage, which there lies in the peculiarity of the building material, that alone made possible the expression of the tolerably wide open stone ceilings over the peripteral and entrance porticos, together with refinements of all kinds in general and in detail.

Other buildings belong to the Doric colonies, like the remains in Himera, in the period in which all uncertainties of the Doric style had almost wholly disappeared, or as in Akragas, in the latest phase of the archaic period (Temple of Dioscuri of about the end of the 6 th century) and in the best period of the 5 th century B.C. After the mighty victory of Himera (480 B.C.), there was at command for the construction the funds of many thousand captive Carthaginians with such enormous booty, that man might attempt the greatest in temple architecture. This fact, connected with the great political event, indeed permitted the erection of the second colossal temple on Sicilian soil -- the Olympic Olympieion at Akragas, which subsequently was not completed at the destruction of the city by the Carthaginians in the year 405 B.C. Other buildings at the close date from the time of its resettlement about [illegible] B.C., when it passed through a later prosperity.

In the time before the attack by the Carthaginians must also be placed the original Temple in Selinus (480-450), or according to others, 450-). In the construction of temples in Sicily and in the colonies in lower Italy, man continued faithful to the native building material, the porous limestone.. which likewise belongs to a portion of the Peloponnesus, where man were satisfied with the ordinary limestone (Reine, Sarcophagi), for our everywhere could the means be obtained for the beautiful white marble. But the striving for resulting proportions and beautiful forms was successfully conducted by the masses, especially to use the less valuable material, even if they must omit the refinements, that appeared in the Doric buildings in Athens , in the refined manner of structure and

from them in details.(the Parthenon in 447-438 B.C., the Propleion in 437, the Theseion in 421, the indeed little Ionic T Temple of the wingless goddess (Nike Apteros; 440-410?) and the Erectheion completed in 407 B.C.), and they must remain behing them by the advantage, which there lies in the peculiarity of the building material, that alone made possible the execution of the tolerably wide span stone ceilings over the peripteral and entrance porticos, together with refinements of all kinds in general and in detail.

Other buildings belong to the Doric colonies, like the remains in Himera, in the period in which all uncertainties of the Doric style had almost wholly disappeared, or as in Akragas, in the latest phase of the archaic period (Temple of Hercules of about the end of the 6 th century) and in the best period of the 5 th century B.C. After the mighty victory of Himera (480 B.C.), there were at command for the construction the hands of many thousand captive Carthaginians with such enormous booty, that men might attempt the greatest in temple architecture. This fact, connected with the great political event, indeed permitted the erection of the second colossal temple on Sicilian soil -- the gigantic Olympeion at Akragas, which apparently was not completed at the destruction of the city by the Carthaginians in the year 405 B.C. Other buildings at the place date from the time of its resettlement about 338 B.C., when it passed through a later prosperity.

In the time before the attack by the Carthaginians must also be placed the unfinished Temple in Egesta (430-420, or according to others, 409). In the construction of temples in Sicily and in the colonies in lower Italy, men continued faithful to the natiwe building material, the porous limestone., which likewise applies to a portion of the Peloponessus, where men were satisfied with the ordinary limestone (Egina, Phigaleia), for not everywhere could the means be obtained for the beautiful white marble. But the striving for beautiful proportions and beautiful forms was successfully conducted by the masters, compelled to use the less valuable material, even if they must omit the refinements, that appeared in the Doric buildings in Athens , in the refined manner of diminution and

on the session of the shaft of the column, the entablature of the round columns, in the colonns of the peristyles portico sculpted toward the cell wall, in the pyramidal header of the cell walls, -- but not in any convexities of the horizontals, -- since they also could not undertake the over line of cells, see those exception, the precious fragile decoration of the entablature in marble, the religious frieze, the marble's ceilings and the marble roof. But they remain therewith no less worthy of admiration!

In the Attic Doric style re'spoken the final word of the Doric style of architecture; it exhibits the highest perfection in the composition and form treatment, but it likewise contains in itself the germs of its destruction. Its characteristic style is comprehensive and its comprehension is especially prominent as the most important moment of the entire Greek temple architecture. Its monuments are here treated in advance, in order to not interrupt the sequence in the text.

less valuable materials than "Doric -- least but not least."

They exhibit the highest perfection of form with well reasoned proportions and moderate dimensions. The columns are a

ion and an entasis scarcely perceptible to the eye, surrounded by 20 flutes of semi-elliptical section with sharp edges. The column is stocky, almost a straight line, and the capital projects but little beyond it; it is surrounded below by a moulding; the moulding is generally marked by a single incision.

The entablature stands in the most beautiful harmony with the supports bearing it; the cornice projections are full, the middle line and dressed, partly influenced by Doric elements. Most of the buildings of this period are constructed of white marble, on which the decorative painting was directly applied. The tympans on them are preserved, although here also color investigations and innovations, as in all the cosmetics of human needs. The painting is always excellent, frequently even invisible, a fact that may be ascribed to the consecrated character of the joints in the course of centuries, after the preservative coating of color disappeared, and the surface of

of the section of the shaft of the column, the enlarging of the angle columns, in the columns of the peripteral portico inclined toward the cell wall, in the pyramidal batter of the cell walls, -- but not in any curvature of the horizontals,-- since they also could not undertake the over fine details,the minute execution, the precious figure decoration of the metopes in marble, the pedigent group, the marble ceiling and the marble roof. But they remain therewith no less worthy of esteem!

In the Attic Doric style is spoken the final word of the Doric style of architecture; it exhibits the highest perfection in the conception and form treatment, but it likewise conceals in itself the germs of its destruction. Its characteristic side is comprehensive and its representation is especially prominent as the most important moment of the entire Grecian temple architecture. Its monuments are here treated in advance, in order to not interrupt the sequence in the technical development of the architecture; contemporary works in less valuable materials then follow -- last but not least.

They exhibit the highest perfection of form with well reasoned proportions and moderate dimensions. The columns are m more slender than in the preceding period, with less diminution and an entasis scarcely perceptible to the eye, surrounded by 20 flutes of semi-elliptical section with sharp edges. The echinus is steep, almost a straight line, and the abacus projects but little beyond it; it is surrounded below by 4 annulets; the necking is generally marked by a single incision.

The entablature stands in the most beautiful harmony with the supports bearing it; the cornice projections are bold, the details fine and graceful, partly influenced by Ionic elements. Most of the buildings of this period are constructed of white marble, on which the decoratiwe painting was directly applied. The technics on them are perfected, although here also occur irregularities and inequalities, as in all the products of h human hands. The jointing is always excellent, frequently even invisible, a fact that may be ascribed to the cementing together of the joints in the course of centuries, after the protecting coating of color disappeared, and the surface of

of the crystalline interiors had been eaten away.

The ashlars are mostly held together by iron cramps and lead-alla set in cast lead, without the use of mortar.

It is not sufficient to assume that the material afforded opportunity for higher spans of the architrave and wider spacing of the columns, for in no Doric monument this exceeded the length of the architraves of the porus temples of the same style. (Compare the Thesseion and Parthenon with the temples in Selinus, Paestum and Olympia). Likewise the opinion that marble gave opportunity for finer forms of details is incorrect, for the same delicacy could be produced in stucco, and as already stated, we judge falsely, if we desire to determine from the preliminary porus profiles of the earlier monuments the greater or lesser refinement of the no longer existing stucco form, of which these were often but the preliminary rough models. (For example, see on some Sicilian porus remains the stuccoed remnants, whose moulding was also not [illegible], but was left three-sided or [illegible] etc.).

To designate porus, i.e., porous limestone, as the Doric building material and to denote from its peculiarities the closer spacing of the columns as a compulsory result, and to ascribe to introduced marble for the possibility and the wish for wider architrave spans is incorrect in view of the existing monuments. In the formal treatment of the Ionic Doric temple marble had scarcely any influence: it merely avoided the otherwise common and less durable stucco coating and made possible the direct application of color to the building material; its use was in almost all cases dictated by local conditions. Where it lay before the gate, it was employed; where this was not the case, man were satisfied in the best period with other materials. (See Pausanias). The Greeks of Asia Minor were opposed to the Peloponnesians, Sicilians and Italians in respect to the building materials in a much [illegible]

[illegible] ble earlier and more easily than those people. -- but the new material produced one change in the Doric temple in the ceiling construction; there are the long span beams and the stone- coffered ceiling the result of the material. Stone

of the crystalline limestone had been eaten away.

The ashlars are mostly held together by iron cramps and dowells set in cast lead, without the use of mortar.

It is not sufficient to assume that the material afforded opportunity for bolder spans of the architrave and wider spacing of the columns, for in no Doric marble monument this exceeded the length of the architraves of the poros temples of the same style. (Compare the Theseion and Parthenon with the temples in Selinus, Egesta and Olympia). Likewise the opinion that marble gave opportunity for finer forms of details is i incorrect, for the same delicacy could be produced in stucco, and as already stated, we judge falsely, if we desire to determine from the preliminary poros profiles of the earlier monuments the greater or lesser refinement of the no longer existing stucco forms, of which these were often put the preliminary rough nucleus. (For example, see on some Sicilian p poros remains the stuccoed rounds, whose nucleus was also not round, but was left three-sided or angular etc.).

To designate poros, i.e., porous limestone, as the Doric building material and to deduce from its peculiarities the c closer spacing of the columns as a compulsory result, and to desire to introduce marble for the possibility and the wish for wider architrave spans is incorrect in view of the existing monuments. On the formal treatment of the facade of the Doric temple marble had scarcely any influence; it merely avoided the otherwise common and less durable stucco coating a and made possible the direct application of color to the building material; its use was in almost all cases compelled by local conditions. Where it lay before the gate, it was employed; where this was not the case, men were satisfied in the best period with other materials.(See Phigaleia). The Greeks of Asia Minor were opposed to the Peloponessians, Sicilians and Italians in respect to the building materials in a much better location; for the given reason could they employ marble earlier and more easily, than those peoples. -- But the new material produced one change in the Doric temple in the ceiling construction; there are the long span beams and the stone coffered ceiling the result of the material. Stone

house 21.50 ft. long with small sectional dimensions, set on a ceiling slabs 13.50 ft. long and 1.47 ft. wide are tombs connected there. The ancient wooden framework covered by heavy mortar must yield to the monumental stone ceiling, at least in the portico and in the front and rear vestibules.

As the most notable examples may be mentioned here:--

a. The so-called Temple of Themis at Rhamnus in Attica (6.5 miles from Marathon), demolished by the Persians, and probably among those not required by the popular will to be rebuilt, was a small chapel-like structure on a rocky terrace about 525 ft. above the sea, and it consisted of a cell and pronaos with a colonnade-in-antis. The height of the columns is 5 1/2 lower diameters, the capital still produces strongly the sub-tuna has 3 annulets between it, while the moving impression is massive. The masonry of the cell consists of polygonal Pentelican marble, and the anthisterial portions of the image are of soft porous limestone.

b. The so-called Temple of Nemesis at Rhamnus was a small peripteral structure of 8 × 12 columns with a pronaos-in-antis, built of marble, the capitals of whose columns exhibit a still earlier form of the echinus, than that of the Parthenon. The date of its erection should be placed at the middle of the 5 th century B.C.

c. The so-called Temple of Theseus in Athens (called a Temple of Heracles or of Hephaistos by others), of the age of Cimon (?), is a peripteral structure with 6 × 13 columns on a substructure of 3 steps, built of white Pentelican marble and resting on a foundation of stone from Piraeus, and it is located in the lower part of the city near the ancient Agora. The date of the erection of this hexastyl temple, one of the best preserved, is not accurately known. The outline of the painted ceiling near stonecutters' marks and letters, whose form indicates the date of about 460 B.C. [1]

Note 1. The marks here mentioned may be classified: it is not impossible for a later institution to cut ancient marks. Proofs of this kind are always risky or even intuitive. --

On the Theseion also see Hauy's essays in Ramsleyer's Denkmäler des alten Athens. [illegible]

beams 21.33 ft. long with small sectional dimensions, coffered ceiling slabs 10.50 ft. long and 1.47 ft. thick are to be counted there. The ancient wooden framework covered by terra cotta must yield to the monumental stone ceiling, at least in the portico and in the front and rear vestibules.

As the most notable examples may be mentioned here:--

a. The so-called Temple of Themis at Rhamnus in Attica (6.9 miles from Marathon), demolished by the Persians, and probably among those not required by the popular will to be rebuilt, was a small chapel-like structure on a rocky terrace about 328 ft. above the sea, and it consisted of a cell and pronaos with a colonnade-in-antis. The height of the columns is 5 1/2 lower diameters, the capital still projects strongly, the echinus has 3 annulets beneath it, while the necking incision is wanting. The masonry of the cell consists of polygonal coursed Pentelican marble, and the architectural portions of the facade are of soft porous limestone.

b. The so-called Temple of Nemesis at Rhamnus was a small peripteral structure of 6 × 12 columns with a pronaos-in-antis, built of marble, the capitals of whose columns exhibit a still stteper form of the echinus, than that on the Parthenon. The date of its erection should be placed at the middle of the 5 th century B.C.

c. The so-called Temple of Theseus in Athens (called a Temple of Hercules or of Hephaistos by others), of the era of Cimon (?), is a peripteral structure with 6 × 13 columns on a substructure of 2 steps, built of white Pentelican marble and resting on a foundation of stone from Piraeus, and it is located in the lower part of the city near the ancient Ceramicos. The date of the erection of this beautiful temple, one of those best preserved, is not accurately known. The coffers of the paneled ceiling bear stonecutters' marks and letters, whose forms indicate the date of about 460 B.C. [1]

*Note 1. The marks here mentioned may be falsified; it is not impossible for a later individual to cut ancient marks. Proofs of this kind are always risky or even indecisive. -- On the Theseion also see Gnay's Essays in Baumeister's Denkmaler des klass. Althert. III. p. 1774-1779. Munich and Leipz-*

[illegible]

7. Dunn, 1929, p. 111, 327, 411, 5387. -- Dunnfield dates the
tlaxcala contemporary with the erection of the temple of Sun-
ion and holds that it is much later than the Parthenon, which
may be true. (See Witt. d. Tlax. Deutschen Arch. Inst. Athen.
Abth. Athens. 1924. p. 326.

The temple structure consists of the single cell with ro-
ness and portico, and it was transformed into a church in
the Christian period, to which circumstance is due its well
preservation.

The columns are constructed of single drums set on each ot-
her, are set inclined toward the wall of the temple, have no
very marked diminution and a somewhat perceptible entasis.
The echinus of the capital is straight in outline, inclined
[illegible]
ly recurves toward the abacus: four delicately carved annulets
surround the flower, and a single incision marks the neckline.
[illegible]
of the upper part of the column, being somewhat bigger than
the frieze. On the latter, only the metopes of the eastern f
ncade and the four adjacent on the sides are decorated by
relief: the others were left smooth, but all were set in
recesses in the triglyphs. As a peculiarity should be remark-
ed the dissimilar treatment of the frieze on the western and
eastern ends of the cell, which appears in both places as a
continuous figure frieze, as in the Ionic order, and does not
have triglyphs. On the eastern end, the heavy beams of the
architrave extend above the sides of the cell to the sporti-
pre of the peripteral colonnade, interpenetrating this at right
angles and resting on one same column. This architrave is
crowned by a moulding decorated by foliage, above which the
frieze concentration extends from one end of the frieze frieze
to the other. Above the frieze is a zeiron decorated by fret
patterns, and which is crowned by a cornice ovolo moulding.
On the western end, the frieze only extends above the colum-
nade of the cell; the architrave and frieze are reduced in
narrow borders on the long sides, while the zeiron move the

*Leipzig. 1888. -- Also Durm's Konstruktive und Polychrome Details der Griechischen Baukunst. Berlin. 1880. (Also in Zeits. f. Bauw. 1879. p. 111, 281, 411, 526). -- Dörpfeld makes the Theseion contemporary with the erection of the Temple of Sunion and holds that it is much later than the Parthenon, which may be true. (See Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abth. Athens. 1884. p. 336.*

The temple structure consists of the simple cell with pronaos and posticum, and it was transformed into a church in the Christian period, to which circumstance is due its good preservation.

The columns are constructed of single drums set on each other, are set inclined toward the wall of the temple, have no very marked diminution and a scarcely perceptible entasis. The echinus of the capital is straight in outline, inclined somewhat less than 45°, and at its greatest projection slightly recurves toward the abacus; four delicately carved annulets surround the former, and a single incision marks the necking.

The architrave is 8.56 ft. long and was set a little back of the upper part of the columns, being somewhat higher than the frieze. On the latter, only the metopes of the eastern f facade and the four adjacent on the sides were decorated by reliefs; the others were left smooth, but all were set in grooves in the triglyphs. As a peculiarity should be mentioned the dissimilar treatment of the frieze on the eastern and western ends of the cell, which appears in both places as a continuous figure frieze, as in the Ionic order, and does not bear triglyphs. On the eastern end, the heavy beams of the architrave extend above the antes of the cell to the architrave of the peripteral colonnade, intersecting this at right angles and resting on the same columns. This architrave is crowned by a moulding decorated by foliage, above which the figure composition extends from one end of the figure frieze to the other. Above the frieze is a geison decorated by fret patterns, and which is crowned by a delicate ovolo moulding. On the western end, the frieze only extends above the colonnade of the cell; the architrave and frieze are returned in narrow borders on the long sides, while the geison above the

[illegible] over the portico extend even to the inner faces on both sides. Corresponding to this omission of the faces, the entablature [illegible] and narrower there. Below the [illegible] course, which projects [illegible] feet, the antes and the wall of the cell have a separate base.

The broad ceiling beams of the portico are arranged without reference to the pointed; thin slabs of marble cover the spaces between these beams and have square openings, which in turn are closed by hollowed circular slabs. This construction of the ceiling, already [illegible] in some detail, is still in very well preserved, together with its vestiges of color.

The flat [illegible], which must have formerly contained [illegible] ornamentation, are now plain and bare; the roof has fallen; a tunnel vault protects the cell from the rain, and this contained a [illegible] collection of antiquities a few years since, but now possess nearly a [illegible] character. The antiques are [illegible] and joined together in the manner previously described; the surface of the marble is covered by the golden [illegible] [illegible] The columns of the peristyle [illegible] injured. In spite of the comparatively good preservation of the monument, it must still be added, that the architrave is defective in [illegible] and is greatly injured, that the floor of the portico is partially broken away, that the columns have been cut into in many places, that very many [illegible] the [illegible] was [illegible] by lightning, so that [illegible] the antis column must be held together by iron [illegible]; that the second column from the southwest antis on the western end has its [illegible] cracked on each other, and the overspringing portion of the abylobate is broken, and the greater number of the columns along the southern side are in the same condition. The middle block of the architrave on the western side shows a crack extending in an oblique direction through the frieze, cornice and the antis [illegible]; another portion of the architrave near the southwest antis is also shattered, and the architrave and cornice of the southern side are much injured

frieze over the portico extends even to the figure frieze on both sides. Corresponding to this omission of the frieze, t the antes assume broader and narrower forms. Below the stone course, which projects 5/16 inch, the antes and the wall of the cell have a separate ogee base. (

The broad ceiling beams of the portico are arranged without reference to the columns; thin slabs of marble cover the spaces between these beams and have square openings, which in turn are closed by hollowed coffer slabs. This construction of the ceiling, already described in some detail, is still in part well preserved, together with its vestiges of color.

The flat tympanums, which must have formerly contained figure ornamentation, are now plain and bare; the roof has fallen; a tunnel vault protects the cell from the rain, and this contained a rich collection of antiquities a few years since, but now retains merely a few plaster casts. The ashlars are wrought and joined together in the manner previously described; the surface of the marble is covered by the golden tint peculiar to Attic monuments. The columns of the peripteral colonnade each stand on an entire block of the stylobate; beneath those of the pronaos and posticum , these step blocks are injured. In spite of the comparatively good preservation of the monument, it must still be added, that the stylobate is defective in arrangement and is greatly injured, that the floor of the portico is partially broken away, that the columns have been cut into in many places, that very many dr drums are moved back from their original positions, and that the northwest angle was much injured by lightning, so that t the angle column must be held together by iron bands; that the second column from the southwest angle of the western end has its drums quite rotated on each other, and the underlying portion of the stylobate is broken, and the greater number of the columns along the southern side are in the same condition. The middle block of the architrave on the western side shows a crack extending in an oblique direction through the frieze, cornice and the entire pediment; another portion of the architrave near the southwest angle is also shattered, and the architrave and cornice of the southern side are much injured by cracks etc. The deformations on the stylobate (exaggerat-

(exaggerated in the drawing) here run in quite irregular zigzag lines; the four angles do not lie in a common plane, as on the Parthenon. What technical importance would be possessed by the curvature of a horizontal line below the horizon amounting to about 1.18 inches in a length of 104.17 ft., or of not quite 0.91 inch for a length of 44.98 ft.?

The cracks in the architrave, the piled-up columns, and certain inaccuracies in the execution, enable us to judge without difficulty of the influence exercised on these monuments by the so-called curvatures.

d. The Parthenon on the Acropolis at Athens , the masterpiece of Iktinos and Callicrates, erected under Pericles 447 to 434 B.C., according to Löschke's very recent investigations, was in both form and magnificence the most important of Doric buildings in the mother country of Greece. It is a peripteral structure with 8 × 17 columns on a substructure of 3 steps (Figs. 366, 367), built of Pentelican marble on a foundation partly of Piraeus stone and partly resting on the solid rock,[1] and it owes its preservation until two centuries since to the circumstance, that in the Christian period it was changed into a church. The enclosed temple is elevated above the floor of the portico by 2 steps and has at its ends hexastyle prostyle inner porticos with massive entrance doorways in the transverse walls. The eastern and principal entrance leads into the cell, divided into 3 aisles by 2 rows of columns, and which contained the chryselephantine statue of the Parthenos; the western leads into an apartment with a ceiling supported by 4 columns, the treasury of the Attic state. The cell was subdivided in its length into two principal apartments. The porticos, pronaos and posticum are all narrow.

*Note 1. The temple commenced by Cimon was narrower and longer, and therefore the existing foundations of the building by Pericles must have been extended in width about 19.68 ft. along the north side. (See Antike Denkmäler, pub. by Kais. Deutsch Arch. Inst. Vol. 1. Berlin. 1887. Pl. 1, where the plan of Cimon is drawn upon that of Pericles; also details concerning its architectural history in Bötticher, A. Die Akropolis in Athen. Berlin. 1888, for which book were used the striking illustrations of the first edition of this volume;*

also Baumeister, Denkm. d. class. Alter. II. Munich & Leipzig. [illegible]

[illegible] the current names of the Parthenon [illegible] "[illegible], the ground plan of the former is to be accepted as correct and certain, according to Dörpfeld's examination. It is here stated that the "Athenian people understood the entire temple to be the Parthenon, but had named the treasury with its vestibule the opisthodome", while the official designations of the rooms were opisthodome, parthenon, hekatompedos and pronaos. (See Cent. d. Bauw. 1891, p. 340; also Mitt. d. [illegible] 1891, p. [illegible] in Deltion (1890, p. 92) and in the journal Athena (1890, p. [illegible]), Lolling published an inscription found on the Acropolis of Athens and interpreted by him, which refers to the old temple of Athena, and which certainly states, that this was called "to hekatompedon" in the 6 th century. Hence he assumes that this also continued in the 4 th century, and it follows from this, that the different parts of the Parthenon have been heretofore named erroneously. But on the contrary, [illegible] 171-[illegible] 151) explains the name of hekatompedon as only fixed for the old Temple of Athena during the period before the Persian war, and holds the given name of Parthenon to be correct.

The external columns are inclined toward the wall of the cell, are composed of drums of medium size, and are surrounded by 20 flutes of elliptical section, which intersect in their edges and disappear at the lowest annulet of the capital. The columns each stand on two blocks of the stylobate, which abut at the axis of the column; they are not strongly diminished and have a slight and scarcely perceptible entasis; the capital has a steeply inclined and almost straight echinus and is surrounded below by 5 annulets, the necking being marked by a single incision. The surface of the architrave is somewhat inclined, and as at the Theseion, it projects beyond the upper surface of the column, is composed of three blocks in its width, and is but very little higher than the

also Baumeister, Denkm. d. class. Alter. II. Munich & Leipzig. 1887. p. 1171; lastly Harrison, J. E. Myth. and Mon. of Anc. Athens. London. 1890. p. 430-469.

*Of the two current plans of the Parthenon by Penrose and Bötticher, the ground plan of the former is to be accepted as correct and assured, according to Dörpfeld's examination. It is here stated that the "Athenian people understood the entire temple to be the Parthenon, but had named the treasury with its vestibule the opisthodome", while the official designations of the rooms were opisthodome, parthenon, hekatompedos and pronaos. (See Cent. d. Bauw. 1881. p. 340; also Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abt. Athens. 1881. pl. 12). In Deltion (1890, p. 92) and in the journal Adena (1890, p. 627), Lolling published an inscription found on the Acropolis of Athens and interpreted by him, which refers to the old Temple of Athena, and which certainly states, that this was called "to hekatompedon" in the 6 th century. Hence he assumes that this also continued in the 4 th century, and it follows from this, that the different parts of the Parthenon have beenn heretofore named erroneously. But on the contrary, Dörpfeld (Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abt. Athens. 1890. pl. 15) explains the name of hekatompedon as only fixed for the old Temple of Athena during the period before the Persian war, and holds the given name of Parthenon to be correct.*

The external columns are inclined toward the wall of the c cell, are composed of drums of medium size, and are surrounded by 20 flutes of elliptical section, which intersect in sharp edges and disappear at the lowest annulet of the capital. The columns each stand on two blocks of the stylobate, which abut at the axis of the column; they are not strongly diminished and have a slight and scarcely perceptible entasis; the capital has a steeply inclined and almost straight echinus and is surrounded below by 5 annulets, the necking being limited by a single incision. The surface of the architrave is somewhat inclined, and as at the Theseion, it projects beyond the upper surface of the column, is composed of three blocks in its width, and is but very little higher than the

[illegible], vases without are inserted in grooves and are decorated around the bases by figure reliefs.

[illegible] the best [illegible]. The cut edges of the friezes do not closely join in the interior of the wall, but are set with interspaces, and are therefore carefully joined together by iron cramps. The triglyph frieze does not extend above the wall of the cella; but as at the Theseion, it is carried into a continuous figure frieze, carried around all four walls, and merely reminiscences of the former are found in the regulae with drops resembling beneath the friezes.

One may conclude in the explanation of Bötticher, that a triglyph frieze was also intended here, but was given up during the progress of the building, and after the blocks with the metopes and drops had already been completed; but it is not probable as the portions of the frieze made of terra cotta, in which circumstances occur over the regulae and drops. The architect certainly did not there consider anything else than the metopes and regulae complete.

The frieze is crowned by a cornice composed of a moulding with leaves, a fillet and an ogee moulding, on which the overhanging and marks of the former painting are still well preserved.

The ceiling of the portico is higher than the pronaos and was only constructed of above beams at the ends; along the sides, large coffered slabs covered the space between the wall of the cell and the colonnade. The partitions were supported by groups of figures, which referred to the birth of Apollo and to her contest with Tityos over Delos. Close with painted architrave commences around above the [illegible] as only and end at the angles with lions' heads; above the architrave on the sides rose a continuous row of antefixes, which as already stated, had no connection with the roof tiles, but were merely ornamental. The cornices of the antes are [illegible] or their recession mouldings painted egg-and-dart as in accordance; the capitals of the accessory vertical cornice of the [illegible] and architrave have but 8 mouldings.

The [illegible] combination of all architectural members, of

frieze, whose metopes are inserted in grooves and are decorated around the temple by figure reliefs.

Triglyphs and metopes are ornamented by a beaded astragal above the head band. The cut blocks of the frieze do not closely join in the interior of the wall, but are set with interspaces, and are therefore carefully joined together by iron cramps. The triglyph frieze does not extend above the wall of the cell; but as at the Theseion, it is changed into a continuous figure frieze, carried around all four walls, and merely reminiscences of the former are found in the regulas with drops remaining beneath the frieze.

One may concur in the explanation of Dörpfeld, that a triglyph frieze was also intended here, but was given up during the progress of the building, and after the blocks with the regulas and drops had already been completed; but it is not applicable to the portions of the frieze made of terra cotta, in which ornaments occur over the regulas and drops. The artist certainly did not there consider anything else than the taenia and regulas complete.

The frieze is crowned by a cornice composed of a moulding with leaves, a geison and an ogee moulding, on which the outlines and marks of the former painting are still well preserved.

The ceiling of the portico is higher than the geison and was only constructed of stone beams at the ends; along the sides, large coffered slabs covered the spaces between the wall of the cell and the colonnade. The pediments were adorned by groups of figures, which referred to the birth of Athene and to her contest with Poseidon over Attica. Cymas with painted anthemion ornaments extend along the pediment cornices only and end at the angles with lions' heads; above the cornices on the sides rose a continuous row of antefixas, wh which as already stated, had no connection with the roof tiles, but were merely ornamental. The capitals of the antes exhibit on their peculiar mouldings painted eggs-and-darts as an eccentricity; the capitals of the accurately vertical columns of the pronaos and opisthodome have but 3 annulets.

The pyramidal diminution of all architectural members, of

ve columns and the walls of his cell, of the architrave and of the triglyph frieze, is carried out with considerable ri-
or in this building; the latter (cut under a right angle) o
the surfaces of the abacus (the later period follows exactly
the opposed principle), and the overhang of the architrave
especially is mentioned. The extremely slight entasis, not
drawn in the earlier publications (which should have a mean-
ture of about 0.018 iron for a drawing of the column 7.20 me-
ters) was first determined by the English architect Penkins
and was then confirmed by Koller and others. A passage of C
ciceros was little considered in former centuries, but already
refers to the obliquity of the axes of columns in general.
When Verres was led into the Temple of Castor, he asked
what he should do there, to which the reply was made: "rath-
ne, unless he might wish to set these columns vertical".
This perfectly ignorant man asked the meaning of "setting ver-
tical". The reply was just in a temple, there was not a sing-
le column, which was not inclined from a vertical.

The movable metallic decorations possessed by the Athenian
were already considered in treating of the architrave: trans-
verse and rectangular holes in the centre of the architrave
connect each metope on the eastern end, as well as circular
[illegible]
ing them. (Fig. 320 d). The shields were sometimes described
as taken from the Persians and dedicated by Alexander, some-
times ascribed to a gift of the doctor Ivcurgus, having been
made up during his flourishing administration. The "Doctrine
Diadic from Demetrios" was taken down again in order to fill
the treasury with the value of the metal; thus this important
ornament had already been lost in antiquity.

Beneath each triglyph of this zone is to be found on the
architrave a number of small holes, drilled with a certain
regularity, which are known to have served for fastening lat-
tice of bronze or of gold.

The rectangular holes without marginal marks or other access-
ories are found on the western end only above the axes of t
the columns, and they are therefore at the joints of the arch-
traves and beneath the centres of the angle triglyphs, so that

the columns and the walls of the cell, of the architrave and of the triglyph frieze, is carried out with considerable rigor in this building; the batter (cut under a right angle) of the surfaces of the abacus (the later period follows exactly the opposed principle), and the overhang of the antes should especially be mentioned. The extremely slight entasis, not drawn in the earlier publications (which should have a magnitude of about 0.013 inch for a drawing of the column 6.31 ins. high) was first determined by the English architect Jenkins and was then confirmed by Hoffer and others. A passage of C Cicero was little considered in former centuries, but already refers to the obliquity of the axes of columns in general. For when Verres was led into the Temple of Castor, he asked what he should do there, to which the reply was made; "nothing, unless he might wish to set these columns vertical". This perfecty ignorant man asked the meaning of "setting vertical". The reply was that in a temple, there was not a single column, which was not inclined from a vertical.

The movable metallic decorations possessed by the Parthenon were already considered in treating of the architrave; transverse and rectangular holes in the centre of the architrave beneath each metope of the eastern end, as well as circular marginal traces, indicate their forms and the mode of fastening them.(Fig. 230 d). The shields were sometimes described as taken from the Pessians and dedicated by Alexander, sometimes ascribed to a gift of the orator Lycurgus, having been hung up during his flourishing administration. The "Lacheres fleeing from Demetrios" was taken down again in order to fill his treasury with the value of the metal; thus this important ornament had already been lost in antiquity.

Beneath each triglyph of this side is to be found on the architrave a number of small holes, drilled with a certain regularity, which are known to have served for fastening letters of bronze or of gold.

The rectangular holes without marginal marks or other accessories are found on the western end only above the axes of t the columns, and they are therefore at the joints of the architrave and beneath the centres of the angle triglyphs, so that

the dromos there must have been of a different kind.

Beneath each architrave on the northern and southern sides, three iron pins 5/8 inch diameter and half inches were inserted to mark the angles of a triangle, and these were evidently intended to receive a special decoration. (Fig. 222 d).

The intervals between the columns of the pronaos and of the opisthodome were closed by metallic grilles extended up to the capitals. Iron pins, similar to those on the architraves of the northern and southern sides, but whose purpose is not explained, are also found on the inner angle of the architraves of the opisthodome and on the sides of the capitals of the columns of the pronaos and of the opisthodome, turned toward the cella. I consider it doubtful to assume these to have been for bird screens, but that they served for fastening patches at injured places.[1]

Note 1. See Mitt. d. Kais. Deutsch Arch. Inst., Athen. Abt. Athens. 1899. c. 229, 230.

The fate of this building, the deformation of the horizontal lines, and the painting, have all been described in various places. After its surface had been corroded, the marble was in part covered by a yellow-brown lichen, especially on the eastern and western ends, while the southern side remained an almost dazzling white, and the northern side shone with a cold gray tone.

The temple of Apollo Epicurius at Bassae or Phigaleia in Arcadia (shortly after 400 B.C.) was erected in gratitude for averting a pestilence, and was a peripteral structure with 6 × 15 columns on a stylobate of 2 steps, executed in a fine white-gray limestone, and was built from the designs of the famous architect of the Parthenon.

Pausanias states that together with its roof, it was of marble (limestone ?), and in consideration of the beauty of the stone and its jointing, describes this as the most beautiful of the temples in the Peloponnesus, after that of Ceres. The cell had a pronaos and a posticum, both with antae, and is 37 feet length divided into two apartments, the front one of these having cylinder-like projections along its sides, whose edges are treated like Ionic half columns and extend to the ceiling.

the decoration there must have been of a different kind.

Beneath each triglyph on the northern and southern sides, three iron pins 3/8 inch diameter and bent upward were inserted to mark the angles of a triangle, and these were again intended to receive a special decoration. (Fig. 236 d).

The intervals between the columns of the pronaos and of the opisthodome were closed by metallic grilles extending up to the capitals. Iron pins, similar to those on the architraves of the northern and southern sides, but whose purpose is not explained, are also found on the inner angle of the architrave of the opisthodome and on the sides of the capitals of the columns of the pronaos and of the opisthodome, turned toward the cell. I consider it doubtful to assume these to have been for bird screens, but that they served for fastening patches at injured places. [1]

*Note 1. See Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abt. Athens. 1889. p. 233, 328.*

The fate of this building, the deformation of the horizontal lines, and the painting, have all been described in various places. After its surface had been corroded, the marble was in part covered by a golden-brown lichen, especially on the eastern and western ends, while the southern side remained an almost dazzling white, and the northern side shone with a cold gray tone.

The Temple of Apollo Epicurios at Bassae or Phigaleia in Arcadia (shortly after 430 B.C.) was erected in gratitude for averting a pestilence, and was a peripteral structure with 6 × 15 columns on a stylobate of 3 steps, executed in a light bluish-gray limestone, and was built from the designs of the famous architect of the Parthenon.

Pausanias states that together with its roof, it was of marble (limestone ?), and in consideration of the beauty od the stone and its jointing, describes this as the most beautiful of the temples in the Peleponnessus, after that of Tegea. The cell had a pronaos and a posticum, both with antes, and is in its length divided into two apartments, the front one of these having pilaster-like projections along its sides, whose edges are treated like Ionic half columns and extend to the ceiling.

The second one smaller room is separated from the forecourt by two oblique piers and a central column, and it has a separate entrance from the side. The central column exhibits a Corinthian column (perhaps the earliest use of this in Tuscany), so that all three orders occur together in this temple, distinguished by its beautiful proportions and details. More recent investigators prefer to consider the middle cell with columns as an uncovered court; I cannot share this assumption, on account of the smallness of the place. The steps of the stylobate differ from the single form, since they exhibit three middle projections on the lower part: the same treatment is repeated in a unique way on the projecting lower corner of the wall of the cell. The columns are proportioned by 8 flutes and are somewhat more than 5 lower diameters in height; they stand absolutely vertical and have no entasis; like those of the Temple at the harbor on Kiria and those of the Temple at Corinth. The orientation from south to north is remarkable and contrary to rule.

The capital even projects somewhat less than that of the Tuscan, and the echinus is decorated beneath by 4 annulets; the neckline is marked by 5 incisions. The bases are diminished and have in the treatment of their cavities something allied to those of the Temple of Zeus in Olympia. The type and the metopes of the external colonnade are left clear; metopes on the ends of the cell are decorated by reliefs; the triglyph frieze is returned at the angles, but does not extend along the sides.

The more important sculptured ornamentation is here placed in the interior, on a raised and richly coffered frieze; it extends along above the series of Ionic columns.

The Ionic-like cyma is decorated by sculptured antefixes and only extends along the inclined cornice of the pediment, terminating with lions' heads at its angles; antefixes are here terminations of the covering tiles and correspond the corner on the sides. The coffers are not all of similar form; square ones (of different sizes) alternate with those of lozenge shape.

The second and smaller room is separated from the former by two oblique piers and a central column, and it has a separate entrance from the side. The central column exhibits a Corinthian column (perhaps the earliest use of this in Greece), so that all three orders occur together in this temple, distinguished by its beautiful proportions and details. More recent investigators prefer to consider the middle cell with columns as an uncovered court; I cannot adopt this assumption, on account of the smallness of the plan. The steps of the stylobate differ from the simple form, since they exhibit three slight recesses on the lower part; the same treatment is repeated in a unique way on the projecting lower course of the wall of the cell. The columns are surrounded by 20 flutes a and are somewhat more than 5 lower diameters in height; they stand absolutely vertical and have no entasis; like those of the Temple at the harbor on Egina and those of the Temple at Corinth. The orientation from south to north is remarkable and contrary to rule.

The capital even projects somewhat less than that of the Parthenon, and the echinus is decorated beneath by 4 annulets; the necking is marked by 3 incisions. The antes are diminished and have in the treatment of their capitals something allied to those of the Temple of Zeus in Olympia. The tympanum and the metopes of the external colonnade are left plain, while those on the ends of the cell are decorated by reliefs; the triglyph frieze is returned at the angles, but does not extend along the sides.

The more important sculptured ornamentation is here placed in the interior, an animated and richly composed figure frieze extends along above the series of Ionic columns.

The Ionic-like cyma is decorated by sculptured anthemions and only extends along the inclined cornice of the pediment, terminating with lions' heads at its angles; antefixas are here terminations of the covering tiles and ornament the cornice on the sides. The coffers are not all of similar form; square ones (of different sizes) alternate with those of lozenge shape. [2]

*Note 2. For the origin of the plan, see Baumeister. III.*

2. Ferri-1929: and concerning the publication-work of the German-
[illegible] [illegible], 1941. [illegible] 61.

Since 1929, the German Archaeological Society, under the direction of Dr. Webbedies, has been occupied with the exploration of the land around the temple and its remains, uncovering the existing materials and erecting them as far as possible, all stones being set in places originally occupied by them. Webbedies then favors the former existence of the Corinthian column, and in a proper manner replies to the questions, why the temple had its entrance on the north, and where the second image stood. The existing temple was preceded by a small sanctuary, the southern room of the former, which was then enlarged in the 5 th century B.C.

The statement of Cockerell, that the coffered marble ceiling stone rested on hollowed marble frame is not proved and has little probability. The small members and the cornices as well as the lonesome form of the coffers, and still more the sculptures, together with a passage in Chandrides decide me to regard the entire structure as a later work. (See Lucas the-ron, also further on the Ionic and Corinthian capers'.

e. The temple of Athena on Cape Sunion was a peripteral structure with 6 columns on the facade and 12 on each side. Those existing are of slender proportions, nearly 9 lower diameters in height and with a noble treatment of the capital: 3 annulets enclose the sweep enhance: a single incision cuts off the necking; 12 flutes surround the shaft in an exceptional way. This temple had about the same dimensions as those of the Temple on the Acropolis of Nike, and it was built of white marble: of it there still stand, deeply corroded by the ocean breeze, 12 columns of the colonnade and an arte with the column appertaining to it, all supportive architrave. Numerous remains cover the ground: 7 courses of the carefully joined substructure are exposed at one side. See in Kitt. A. Asia. Deutsch Arch. Inst. (Athen Abt. Athens. 1884) Dörpfeld-a report of the excavations and his drawings (Ibs. 16, 18; p. 324-327), according to which the plan of an earlier terra of porous stone was found beneath the marble temple, whose sculpture and stone were even better preserved than those of the

*p. 1319-1324; and concerning the primitiveness of the Corinthian column, see Annc d. Inst. 1865. p. 43, 61.*

Since 1902, the German Archaeological Society, under the direction of Dr. Kabbadias, has been occupied with the examination of the land around the temple.and its remains, uncovering the existing materials and erecting them as far as possible, all stones being set in places originally occupied by them. Kabbadias then favors the former existence of the Corinthian column, and in a proper manner replies to the questions, why the temple had its entrance on the north, and where the sacred image stood. The existing temple was preceded by a small sanctuary, the southern room of the former, which was then enlarged in the 5 th century B.C.

The statement of Cockerell, that the coffered marble ceiling slabs rested on hollowed marble beams is not proved and has little probability. The small members and the capitals as well as the lozenge form of the coffers, and still more the sculptures, together with a passage in Thucydides decide me to regard the entire structure as a later work.(See Durm thereon, also further on the Ionic and Corinthian orders).

e. The temple of Athena on Cape Sunion was a peripteral structure with 6 columns on the facade and 18 on each side. Those existing are of slender proportions, nearly 8 lower diameters in height and with a noble treatment of the capital; 3 annulets enclose the steep echinus; a single incision cuts off the necking; 16 flutes surround the shaft in an exceptional way. This temple had about the same dimensions as those of the Temple on the Acropolis of Egina, and it was built of white marble; of it there still stand, deeply corroded by the ocean breeze, 11 columns of the colonnade and an ante with the column appertaining to it, all supporting architraves. Numerous remains cover the ground; 7 courses of the carefully joined substructure are exposed at one side. See in Mitt. d. Kais. Deutsch Arch. Inst. (Athen Abt. Athens. 1884) Dörpfeld-s report of the excavations and his drawings (pls. 15, 16; p. 324-327), according to which the plan of an earlier temple of porous stone was found beneath the marble temple, whose stylobate and steps were even better preserved than those of the

inner temple. The columns still stand upright and support a portion of the superstructure; the plan of the interior of the temple can no longer be determined.

The sketch published by Flandin at the time is to be regarded as an (unusual) satisfactory. As already stated, the building must be contemporary with the Tiberion at Athens.

D. Prototypes and Contemporaries of the Attic Doric Bricks-structures.

At the head of the prototypes and contemporaries of the Doric rule temples of the 5 th century, executed in porous stone limestone or in ordinary dense limestone with wooden beam construction [illegible] the Ionic order, [illegible] tion of the style, as already stated, there exists it has different the so-called "mode of Possidon in Pesaum, so said one in the effect.

[illegible]

ro of the middle of the 6 th century, with 5 x 14 columns on a substructure of 3 steps, with pronaos and cella(?)-" chambers between antes and stylis at the corners; the cella divided into 3 aisles by 2 rows of columns, the central aisle narrow and long. (About 18.12 ft. wide).

The columns here 24 Ionic, are diminished quite strongly with nearly no entasis and are inclined inward: the spacing of the capital projects widely, the echinus is not high and has a clastic curve, and there are 4 annulets and 8 incisions at the neckline. The architrave is in blocks about 1.6,[illegible] ft. long and line in the same plane as the upper circumference of the column; the triglyphs are slender, somewhat turned toward at the top, as on Temple C in Selinus; the grooves are in rounded-arched form without covers at the angles; the metopes are without sculptured ornament, are broad and have nearly bases of heights equal to those of the triglyphs; the cornice is of strong height and projection, and it is decorated at top by a cove and a small bead instead of a cyma. The total height of the substructure rises into the height of the column 2 1/2 times. Besides the customary form, the internal temples exhibit the last round. The columns in the interior of the cell have 20 flutes on the lower order and

later temple. Nine columns still stand upright and support a portion of the entablature; the plan of the interior of the temple can no longer be determined.

The sketch published by Blouet at the time is to be regarded as in general satisfactory. As already stated, the building might be contemporary with the Theseion at Athens.

IV. Prototypes and Contemporaries of the Attic Doric Marble Structures.

At the head of the prototypes and contemporaries of the Doric marble temples of the 5 th century, executed in porous shell limestone or in ordinary dense limestone with wooden beam ceilings of the porticos and cell, but distinguished by the fixform of the style, as already stated, there stands in the first line the so-called Temple of Poseidon in Paestum, so solemn in its effect.

a. The Temple of Poseidon in Paestum, a peripteral structure of the middle of the 6 th century, with 6 × 14 columns on a substructure of 3 steps, with pronaos and opisthodome, colonnades between antes and stairs at the entrance; the cell d divided into 3 aisles by 2 rows of columns, the central aisle narrow and long.(About 18.12 ft. wide).

The columns have 24 flutes, are diminished quite strongly with hardly any entasis and are inclined inward; the abacus of the capital projects widely, the echinus is not high and has an elastic curve, and there are 4 annulets and 3 incisions at the necking. The architrave is in blocks about 14.76 ft. long and lies in the same plane as the upper circumference of the column; the triglyphs are slender, somewhat curved forward at the top, as on Temple C in Selinus; the grooves end in pointed-arched form without coves at the angles; the metopes are without sculptured ornament, are broad and have head bands of height equal to those of the triglyphs; the geison is of strong height and projection, and it is decorated at top by a cove and a small bead instead of a cyma. The total height of the entablature goes into the height of the column 2 1/2 times. Besides the customary forms, the internal members exhibit the half round. The columns in the interior of the cell have 20 flutes on the lower order and

only 13 on the prow ore. (Probably arranged in accordance with the relative dimensions of the surfaces of the columns). The curved and inward convexities and cavets on the great temple-like architectural members are to be ascribed to defects in workmanship, easily to be reconstructed. The only temple in the Doric style of architecture in which the internal construction is preserved for us in a form worthy of examination, it is also distinguished by solid construction in earlier masonry, essentially joined together without mortar. The same limestone was used here as in the basilica and the "temple of Ceres", and it therefore required a coating of stucco and color. The other sculptures are not accidentally dressed in some places; there frequently occur roughly worked surfaces surrounded by drafts, so that the temple cannot be assumed to have been completed in all its parts.

[illegible], more reserved for the place of its location and for the very famous and most important work of Greek sculpture closed within its walls, the Olympiadgeantine statue by Phidias, than for its architectural beauty, was a peripteral structure 6 × 15 columns, with front and rear vestibules with antes, a built of native tufaceous limestone or shell conglomerate by the Elean Lion (only the roof tiles consist of Pentelicon marble). The diameters of the columns frequently differ around 2 inches, and they were obviously curtailed: the capital has a broad abacus and "a high, soft, nobly profiled cornice" with a Attic simplets and 8 isotisons at the moulding. The architrave was proportionally light: the length of the architrave blocks varies from 16.81 to 17.08 and 17.22 ft.; in width it was composed of three massive blocks 2.10, 1.87 and 2.38 ft.; and as usually the case, the outer blocks also have small abutment seen other at front angles, the joints on the long side extending through, those behind it in the opposite direction. The frieze and architrave in the interior of the pertistyl colonnade lie in the same plane, and a vacant space was left between the triglyph friezes and the continuous friezes. The cella capital was elaborately shaped, and it consisted of a cove and a peculiar cove leaf moulding, almost

only 16 on the upper one.(Probably arranged in accordance with the absolute dimensions of the surfaces of the columns). The outward and inward curvatures and cracks on the great horizontal architectural members are to be ascribed to defects in workmanship, easily to be recognized. The only temple in the Grecian style of architecture in which the internal construction is preserved for us in a form worthy of examination, it is also distinguished by solid construction in ashlar masonry, beautifully joined together without mortar. The same limestone was used here as in the Basilica and the Temple of Demeter, and it therefore required a coating of stucco and color. The outer surfaces are not smoothly dressed in some places; there frequently occur roughly worked surfaces surrounded by drafts, so that the temple cannot be assumed to have been completed in all its parts.

b. Beside it stands the well known Temple of Zeus in Olympia, more renowned for the place of its location and for the very famous and most important work of Grecian sculpture placed within its walls, the chryselephantine statue by Phidias, than for its architectural beauty, was a peripteral structure 6 × 13 molumns, with front and rear vestibules with antes, a built of native tufaceous limestone or shell conglomerate by the Elean Libon (only the roof tiles consist of Pentelican marble). The diameters of the columns frequently differ about 2 inches, and they were strongly diminished; the capital has a broad abacus and "a high, soft, nobly profiled echinus" with 4 Attic annulets and 3 incisions at the necking. The entablature was proportionally light; the length of the architrave blocks varies from 15.81 to 17.028 and 17.22 ft.; in width it was composed of three unequal blocks 2.56, 1.67 and 2.33 ft.; and as usually the case, the outer blocks also here abut against each other at right angles, the joint on the long side extending through, those behind it in the opposite direction. The frieze and architrave in the interior of the peripteral colonnade lie in the same plane, and a vacant space was left between the triglyph frieze and the continuous frieze. The ante capital was elegantly shaped, and it consisted of a cove and a peculiar ogee leaf moulding, almost

exactly similar to that at Ghiberti. As in Ghiberti and on the bronze in Berlin, an internal triforium frieze was carried above the front and rear vestibules, and this was returned on in the temples mentioned. The cell walls are constructed of ashlars carefully fastened together by iron cramps set in lead, the lowest courses being composed of blocks set on edge (as on the Parthenon, Theseion, in Paestum etc.), and the cell was internally divided into three aisles by two rows of columns, which in part may have been separated from each other by metallic grilles, for minor frieze frames seem to appear on the lower cranes of the three western pairs of columns of the central aisle.[1]

Note 1. See the excellent and detailed representation in the great German work: Der Tempelbau der von Pausanias Beschriebenen Zeit.

The temple was most fully described by Pausanias such as all the angles of the pediment, the gilded goddess of Victory on the apex of the gable, the nine figure sculptured compositions of the pediment and of the metopes at the end of the temple. The mentions Leonidas of Nemos and Alkamenos, the contemporary of Phidias and next to him the first of artists in sculpture, as sculptors of the pediment figures. He intimates that the beautiful statue of Fate found by the German excavation was the work of the same Leonidas. But in comparison with the statues of Zeus and the figures by Phidias, the pediment statues are of much inferior value, that they cannot have been the work of the same or of equally famous contemporary artists. After the image of Zeus had been completed, it may have been deemed to accord to the sculptors employed the commission for the execution of the new pediment statues in place of the antiquated and stiffly archaic ones, which was not carried out fearing the beginning calamities of the civil war, so that a connection arose between the names of famous artists and the magnificent pediment sculptures, again brought to light. Pausanias likewise mentions the bronze doors, the inner colonnades in two lines, one above the other, by which access was made possible to the statue of the god, the winding

exactly similar to that at Phigaleia. As in Phigaleia and on the temples in Selinus, an internal triglyph frieze was carried above the front and rear vestibules, and this was returned as in the temples mentioned. The cell walls are constructed of ashlars carefully fastened together by iron cramps set in lead, the lowest course being composed of blocks set on edge (as on the Parthenon, Theseion, in Paestum etc.), and the cell was internally divided into three aisles by two rows of columns, which in part may have been separated from each other by metallic grilles, for which fixing holes seem to appear on the lower drums of the three western pairs of columns of the central aisle. [1]

*Note 1. See the excellent and detailed representation in the great German work; Der Ergebnisse der vom Deutschen Reich veranstalteten Ausgrabungen. II. Architecture. Berlin. 1892.*

The temple was most fully described by Pausanias among all Grecian monuments. He speaks of the gilded prize vases on the angles of the pediment, the gilded goddess of Victory on the apex of the gable, the rich figure sculptured decorations of the pediment and of the metopes at the end of the temple. He mentions Paeonios of Mende and Alkamenos, the contemporary of Phidias and next to him the first of artists in sculpture, as sculpturs of the pediment figures. He intimates that the beautiful statue of Nike found by the German expedition was the work of the same Paeonios. But in comparison with the statues of Nike and the figures by Phidias, the pediment statues are of such inferior value, that they cannot have been the work of the same or of equally famous contemporary artists. After the image of Zeus had been completed, it may have been decided to award to the sculptors mentioned the commission for the execution of the new pediment statues in place of the antiquated and slightly artistic ones, which was not carried out during the beginning calamities of the civil war, so that a connection arose between the names of famous artists and the ungraceful pediment sculptures, again brought to light. Pausanias likewise mentions the bronze doors, the inner colonnades in two tiers, one above the other, by which access was made possible to the statue of the god, the winding

statuary even hewn out of the rock, which must have been a marvel, clever and built of wood, the god being seated on a throne, his head adorned by a garland of olive leaves, and with the lyre standing on his right hand, and the waist then also decorated by patterns by Sennacherib, the consecrated grits and the great array of sacrifices. The temple and its art work are sunk into ruin and disappeared beneath the alluvial soil; [illegible]

of it, and the latest German expedition considerably increased the finds, although the parts of the building were found to be lower rise more than 4.72 ft. above the original level of the earth beneath them.

There follows here:--

c. The temple of Ashur on the island of Sejins stood on a far visible flat terrace of rock, and it has a peripheral structure of 8 × 12 columns on a substructure of 3 steps. The temple structure consists of cell, pronaos and crinkdoms, leading at the ends in colonnades between antae, the interior being divided in three aisles by 2 rows of columns, 5 in each. The columns are moderately massive with a somewhat pronounced tible shafts and are surmounted by 20 flutes. The capital is still Doric with and abacus and echinus, decorated by 4 annulets, the pressing indicated by 3 horizons. The flutes are in flat curves, their surfaces coincides with the lower edge of the lowest annulet. The lines of the architrave is inclined forward in front of the upper circumference of the column; the substructure does 2 1/2 times into the height of the column; the latter is 4 1/2 times as high as the superstructure of 2 steps. The height of the pediment (typanum) is 2/11 the base line; the wall of the tympanum is set back behind the face of the architrave. The angles of the pediment are decorated by griffins carved in marble, and the apex by a sphinx ornament and two small figures of the same material. The figure pediment figures (now in Munich) are likewise executed in white marble, while the entire architectural portions are constructed of porous limestone, covered with stucco and decorated by painting, numerous vestiges of which are still preserved.

staircase even leading upon the roof, which must have been n narrow, close and built of wood, the god being seated on a throne, his head adorned by a garland of olive leaves, and with the Nike standing on his right hand, and the walls were also decorated by paintings by Panainos, the consecrated gifts and the great altar of sacrifice. The temple and its art works sank into ruin and disappeared beneath the alluvial soil; the French expedition under Blouet merely recovered a portion of it, and the latest German expedition considerably increased the finds, although the parts of the building were found to no longer rise more than 4.92 ft. above the original level of the earth beneath them.

There follows here:--

c. The Temple of Aphaia on the island of Egina stood an a far visible high terrace of rock, and it has a peripteral structure of 6 × 12 columns on a substructure of 3 steps. The temple structure consists of cell, pronaos and opisthodome, opening at the ends in colonnades between antes, the interior being divided in three aisles by 2 rows of columns, 5 in each. The columns are moderately diminished with a scarcely perceptible entasis and are surrounded by 20 flutes. The capital is still rather high and strongly projecting, decorated by 4 annulets, the necking indicated by 3 incisions. The flutes end in flat curves, their endings coinciding with the lower edge of the lowest annulet. The face of the architrave is brought forward in front of the upper circumference of the column; the entablature goes 2 1/2 times into the height of the column; the latter is 4 1/2 times as high as the substructure of 3 steps. The height of the pediment (tympanum) is 2/15 its base line; the wall of the tympanum is set back behind the face of the architrave. The angles of the pediment are decorated by griffins carved in marble, and the apex by a scroll ornament and two small figures of the same material. The famous pediment figures (now in Munich) are likewise executed in white marble, while the entire architectural portions are constructed of porous limestone, covered with stucco and decorated by painting, numerous vestiges of which are still preserved. [1]

in the work -- Leipzig, Das Heiligtum der Athena, Berlin, 1909, p. 49. Note. "We have not succeeded in finding remains of lime-wash stucco coating on the walls, but the walls themselves shine (?) in their natural yellowish color, so far as the [illegible] are nearly 2500 years old, but on the contrary will add a note from my diary of Sept. 12, 1889:-- "Temple on Island of Aegina yellow limestone with stucco coating, on the western side are still many remains of orange-yellow colored coating on the walls of the cell. Likewise on the columns are colored remains of stucco. On the architrave are remains of splendid small blue color. The mutules with deep yellow, the band above being red. This was seen 40 years since! My conductions were the Italian Tiner, which [illegible] Architrave, [illegible] test Miller Jr., then in Athens.

Sequlas are found on the architraves of the pronaos and of the colonnades of the cella, while to them corresponds no arrangement of triglyphs in the friezes lying above them. Above [illegible] been extended to the roof, and solid blocks of stone with arrangements for connection with the adjacent courses of tiles were placed instead of gutter tiles at the junction of the wall and the surface of the roof. Goekerell explains these as being the enclosing blocks of a hypaethron, which the smallness of the temple, aside from the previous statements in regard to this point, causes to appear unnecessary. The sun might already be quite high and still cast its rays throughout the entire length of the temple. The conditions for lighting the interior were very favorable here by means of the great doorway and the elevated site of the temple. The columns were inclined toward the cell; 32 of them still are standing, minor work on the upper surfaces, in many places held together by iron bands, and still partly corrected by architraves, while the friezes, geison, and the walls of the cell are prostrate on the ground. The clamping together and the provision for setting the dressed stones are of interest. (Note 1 above).

*Note 1. On this A. Furtwängler and his colaborers remark in the work:-- Aegina, Das Heiligtum der Aphaia. Munich. 1906, p. 49. Note. "We have not succeeded in finding remains of light yellow stucco coating on the walls, but the walls themselves shine (?) in their natural yellowish color, so far as the stone is still freshly preserved." I shall not enter further on the "shining" of the "freshly preserved" stone surfaces, that are nearly 2500 years old, but on the contrary will add a note from my diary of Sept. 13, 1869:-- "Temple on Ægina of grayiish yellow limestone with stucco coating, on the western side are still many remains of orange-yellow colored coating on the walls of the cell. Likewise on the columns are colored remains of stucco. On the ashlars are remains of splendid smalt blue color. The mutules with deep yellow, the band above being red. This was seen 40 years since! My companions were the painter Klose, still living in Carlsruhe, and the architect Ziller Jr., then in Athens.*

Regulas are found on the architraves of the pronaos and of the colonnades of the cells, while to them corresponds no arrangement of triglyphs in the frieze lying above them. Above the upper colonnade of the cell, the masonry appears to have been extended to the roof, and solid blocks of stone with arrangements for connection with the adjacent courses of tiles were placed instead of gutter tiles at the junction of the wall and the surface of the roof. Cockerell explains these as being the enclosing blocks of a hypaethron, which the smallness of the temple, aside from the previous statements in regard to this point, causes to appear unnecessary. The sun might already be quite high and still cast its rays throughout the entire length of the temple. The conditions for lighting the interior were very favorable here by means of the great doorway and the elevated site of the temple. The columns were inclined toward the cell; 21 of them still are standing, much worn on the upper surfaces, in many places held together by iron bands, and still partly connected by architraves, while the frieze, geison, and the walls of the cell lie prostrate on the ground. The clamping together and the provision for setting the dressed stones are of interest. (Note 1 above).

ment of steps on the eastern front. The cell is still long and is placed between a pronaos and an oikothekene, each with a colonnade between antes; at the end of the cell was a small

rance were statue, which led to the attic. The columns had 24 flutes and were quite strongly diminished, yet were almost without entasis; the echinus was high and inclined less than

by 4 annulets, and with a single incision as a cushing member. The face of the architrave coincides with a tangent to the upper surface of the column. On the walls, the architrave is still high and heavy, the sure capitals are still of unusual shape, and the grooves of the triglyphs and in recurved cornice

ue limestone: the surfaces were covered by stucco.

5. The so-called Temple of Concordia in Akragas is a peripteral structure with 6 × 13 columns, and is of medium size with columns arranged between antes, opisthocome and pronaos, a cornment wall and a peculiarly formed opening in this above

are without marked entasis, have an echinus of extremit profile on the capital, a series of 4 annulets, but no incision

rials for the temple were furnished by the yellowish lime-stone already mentioned; its better preservation is probably due to the circumstance, that it was once transformed into a Christian church (in the 16 th century; S. Giorgio della Vasce). For this purpose, the cell walls were unfortunately perforated so by 12 large openings with round heads, and the intervals between the columns were walled up in order to thereby produce a 3-aisled interior. The entablature of the temple is rather heavy; the columns each consist of 3 drums. It was restored in 1925 and now belongs with the best preserved monuments of antiquity.

6. The so-called Temple of Castor and Pollux in Akragas was peripteral with 6 × 13 columns on a substructure of

d. The so-called Temple of Hercules in Akragas is a peripteral structure with 6 × 13 columns with an extended arrangement of steps on the eastern front. The cell is still long and is placed between a pronaos and an opisthodome, each with a colonnade between antes; at the end of the cell was a small shrone for the statue of the god; left and right of the entrance were stairs, which led to the attic. The columns had 24 flutes and were quite strongly diminished, yet were almost without entasis; the echinus was high and inclined less than 45°, but was still somewhat swelled in form, decorated beneath by 4 annulets, and with a single incision as a necking member. The face of the architrave coincides with a tangent to the upper surface of the column. On the whole, the entablature is still high and heavy, the ante capitals are still of uncouth shape, and the grooves of the triglyphs end in recurved cushion forms. The building material consists of yellowish porous limestone; the surfaces were covered by stucco.

e. The so-called Temple of Concordia in Akragas is a peripteral structure with 6 × 13 columns, and is of medium size with columns arranged between antes, opisthodome and pronaos, with stone steps at the entrance and leading to the roof, with a pediment wall and a peculiarly formed opening in this above the ante colonnade. The columns are not greatly diminished, are without marked entasis, have an echinus of straight profile on the capital, a series of 4 annulets, but no incision at the necking; the ante capitals are of heavy form. The materials for the temple were furnished by the yellowish limestone already mentioned; its better preservation is probably due to the circumstance, that it was once transformed into a Christian church (in the 15 th century; S. Giorgio della Rape). For this purpose, the cell walls were unfortunately perforated by 12 large openings with round heads, and the intervals between the columns were walled up in order to thereby produce a 3-aisled interior. The entablature of the temple is rather heavy; the columns each consist of 5 drums. It was r restored in 1788 and now belongs with the best preserved monuments of antiquity.

f. The so-called Temple of Casotr and Pollux in Akragas w was peripteral with 6 × 13 columns on a substructure of 3 steps.

The Sicilian Archaeological commission caused the three columns of the northeast angle with the corresponding entablature and that portion of the pediment to be rebuilt with the ancient materials. The yellowish limestone was covered by stucco; lions' heads, red and blue frets and painted palm leaves have preserved evidences of polychromy.

g. The so-called Temple of Demeter and Proserpina in Akragas, whose ruins were built into the Church of S. Blasius, was a small cell with antes; only the substructure and a portion of the cell wall resting on 3 steps are still preserved; nothing now remains of the cornice and of the columns.

h. The so-called Temple of Asclepios in Akragas is still smallar than the preceding, and it was a double ante temple on a substructure of 4 steps. Of this, there yet remains two columns and the antes of the northern angle of the cell wall to a height of about 16.40 ft., with most of the walls of the cell and the southern antes. No portion of the capitals or of the cornice now exists.

l. The so-called Temple of Zeus Polieus is Akragas was built into the Church of S. Maria de Greci. The remains consist of steps on the northern side, on which rise the stumps of 8 Doric columns, together with portions of the southern substructure and a few fragments of the entablature. The temple was really a peripteral structure with 6 columns in front.

m. The Temple at Egesta (Segeste) was a peripteral building with 6 × 14 columns, located on the brink of a deep ravine through which flows the brook Pispisa, was never entirely completed, but so far as finished, is executed in noble p proportions. Only a few foundation stones of the cell have been found; the columns are composed of an unusual number of drums (10 to 13), only roughly dressed and without flutes. The capitals are bold and are decorated by 3 large annulets; the incisions at the necking are also lacking. The face of the architrave is set forward; the entablature and the height of the pediment are finely proportioned. The material of which the temple is built is a limestone of the vicinity, which by the lapse of time has become a beautiful golden brown, and which has well resisted the effects of exposure. The date of erection is usually assumed prior to 409 B.C., before the Car-

Carthaginian invasion put an end to the architectural activity of the Greeks.[1]

Note 1. For the study of the arrangement of stereobatics and for the procedure of this work, no other Greeks temple affords such interesting material as that in Segesta. By a thorough investigation with the necessary outlay of time and money, much valuable knowledge must be obtained there.

n. Of the Temple of Gaia, only a single column still remains.

o. The Temple north of the city of Himera and near the sea is a Doric structure, whose columns nearly coincide in magnificence with those of the Temples of Juno and of Concordia. It [illegible] now in the Museum at Palermo.

p. The Temple (A in Hittorf) on the acropolis of Selinus [illegible] structure of 4 steps, with pronaos, opisthodome, and a cell divided in two parts in length, and it probably belongs to the [illegible] is square, with little or even no entasis; 20 flutes surround the shaft; the sections of the capital is abacus and echeo, decorated by 8 annulets, and the bearing is indicates by 8 incisions. The length of the architrave runs from 9.21 to 10.40 ft. The proportions of the building are in general similar to Attic. A winding staircase, which was on the right of the entrance and in the first apartment of the cell, is still to be mentioned. Not a single unit of a column of this temple has been entirely preserved; most of the stones of the one living remnant the are have been removed.

q. The Temple (B in Hittorf) in Selinus, the southernmost on the eastern plateau, was a peripteral structure of 7 × 15 columns on a substructure of 4 steps, the lower steps of less height than the upper ones, with a broad flight of steps extending along 3 intercolumnations at one end, and likewise b belonging to the completely developed style. The cell has t the same size as that of temple A; the first apartment of the cell is on a level considerably higher than that of the pronaus, and the second room is again higher than the first. The columns are slightly diminished, are animated by 20 flutes a

Carthaginian invasion put an end to the architrectural activity of the Egestans. [1]

*Note 1. For the study of the arrangement of stonecutting and for the procedure of this work, no other Grecian temple affords such interesting material as that in Egesta. By a thorough investigation with the necessary outlay of time and means, much valuable knowledge must be obtained there.*

n. Of the Temple of Gela, only a single column still remains.

o. The Temple north of the city of Himera and near the sea is a Doric structure, whose columns nearly coincide in magnificence with those of the Temples of Juno and of Concordia. B Beautiful fragments of it, among which are lions' heads, are now in the Museum at Palermo.

p. The Temple (A in Hittorf) on the acropolis of Selinus was a small peripteral structure with 6 × 14 cloumns on a substructure of 4 steps, with pronaos, opisthodome, and a cell divided in two parts in length, and it probably belongs to the completely developed style. The diminution of the column is slight, with little or even no entasis; 20 flutes surround the shaft; the echinus of the capital is straight and steep, decorated by 3 annulets, and the necking is indicated by 2 incisions. The length of the architrave blocks runs from 9.21 to 10.89 ft. The proportions of the building are in general similar to Attic. A winding stairway, which was on the right of the entrance and in the first apartment of the cell, is still to be mentioned. Not a single shaft of a column of this temple has been entirely preserved; most of the stones of the one lying nearest the sea have been removed.

q. The Temple (R in Hittorf) in Selinus, the southernmost on the eastern plateau, was a peripteral structure of 6 × 15 columns on a substructure of 4 steps, the lower steps of less height than the upper ones, with a broad flight of steps extending along 3 intercolumniations at one end, and likewise b belonging to the completely developed style. The cell has t the same plan as that of temple A; the first apartment of the cell is on a level considerably higher than that of the pronaos, and the second room is again higher than the first. The columns are slightly diminished, are animated by 20 flutes a

[illegible] of 2 [illegible] seen. The entirea of the capital is [illegible]
and at almost less than 60°, is nearly a straight line in [illegible]
tile, and it has 4 annulets and a single torsion at the [illegible]
tra. On the other hand, the ante capital is again set back
of the line of the upper circumference of the column; the r[illegible]
[illegible]
[illegible] 2 1/4 times into the height of the column; the
height of the pediment amounts to 1/5 the [illegible] of the triang[illegible]
le. Vestiges of painting have been found in many places, and
there is still a fine white stucco on the frame of the columns.
Barrettiello describes one of them as painted with horizontal
[illegible] of red, white and blue. The entablat of the capital was
red, the band band of the architrave was of the same color,
and the triglyphs were blue; the [illegible] of the metope fig-
ures were colored; black and red [illegible] on a yellow ground, a
and black and yellow decorations occur on the terra cottas.

The remains of sculptures (6 metopes, discovered by the Eng-
lish architects Harris and Angell and removed in 1821) were
arranged between the triglyphs of the pronaos and opisthodomos,
and recall the works of the era of Phidias. The nude contr-
ors of the female figures, arms, hands and feet, are made of
white marble, all the remainder being of limestone from Hem-
ritch. They are now placed in the Museum of Fatras beside
the more ancient metopes from Selinus. These columns of the
temple still stand partially upright at the southeast angle:
all the remainder have fallen.

c. Of the little so-called Temple of Hemeroles (5 in Fat-
ras) on the acropolis of Selinus, only the foundations, the
lower portions of the western rear wall and considerable re-
mains of the side walls have been preserved to us: but mono-
lithic of the front and still exists. According to the ruins d
discovered, Serradifalco explains the arrangement as being a
Doric [illegible] were [illegible], while [illegible] of the [illegible]
a portion of an Ionic capital found in the vicinity, restores
the temple as a prostyle structure with 4 Ionic columns before
the cell, with a Doric triglyph frieze above them. The vest-
iges of color on this temple have for the [illegible] and the entab-
lature a pale yellow tone on the stucco coating: the traces of

consist of 7 drums each. The echinus of the capital is inclined at almost less than 45°, is nearly a straight line in profile, and it has 4 annulets and a simple incision at the necking. On the other hand, the ante capital is again set back of the line of the upper circumference of the column; the blocks measure 14.60 ft. to 15.45 ft.; the height of the entablature goes 2 1/4 times into the height of the column; the height of the pediment amounts to 1/8 the base of the triangle. Vestiges of painting have been found in many places, and there is still a fine white stucco on the drums of the columns. Serradifalco describes one of them as painted with horizontal bands of red, white and blue. The astragal of the capital was red, the head band of the architrave was of the same color, and the triglyphs were blue; the draperies of the metope figures were colored; black and red frets on a yellow ground, a and black and yellow decorations occur on the terra cottas.

The remains of sculptures (5 metopes, discovered by the English architects Harris and Angell and removed in 1831) were arranged between the triglyphs of the pronaos and opisthodome, and recall the works of the era of Phidias. The nude portions of the female figures, arms, hands and feet, are made of white marble, all the remainder being of limestone from Memfrici. They are now placed in the Museum of Palermo beside the more ancient metopes from Selinus. Three columns of the temple still stand partially upright at the southeast angle; all the remainder have fallen.

r. Of the little so-called Temple of Empedocles (B in Hittorf) on the acropolis of Selinus, only the foundations, the lower portions of the western rear wall and considerable remains of the side walls have been preserved to us; but nothing of the front end still exists. According to the ruins d discovered, Serradifalco explains the sanctuary as being a Doric ante temple, while before him Hittorf, on the basis of a portion of an Ionic capital found in the vicinity, restored the temple as a prostyle structure with 4 Ionic columns before the cell, with a Doric triglyph frieze above them. The vestiges of color on this temple gave for the antes and the entablature a pale yellow tone on the stucco coating; the bands of

of the cornice, of the metopes and of the architrave, were painted red, the mutules themselves, the triglyphs and the regulae were blue, while the drops remained white (probably originally gilded); the grooves of the triglyphs were made a dark blue-black.

e. The Temple of the so-called Juno Lacinia in Akragas is a peripteral building with 6 × 13 columns and is of moderate [illegible]. [illegible] of the capital is boldly and nobly profiled, and decorated beneath by 3 annulets; the neck band consists of 3 incisions. The apex of the architrave is broken forward; the cornice and the antefixes are lacking. The material is a yellowish coarse limestone, now very much weathered, and formerly covered with stucco. Only 4 columns are wanting, and 16 still retain their capitals; the northern side still has its entire architrave and a few pieces of the frieze; otherwise, only a block of the architrave remains on the southern side. Hazzidakis saw the temple while still complete, yet he complained of the received some repairs by Torremuzza in 1788.

f. As one of the finest creations of the Doric of the 5 [illegible] of Athens on Corydis, now built into the Cathedral of Syracuse.

The shafts of its columns consist of 5 drums, of unusually careful work, with a steep and almost straight line equipped with 3 broad and flat incisions between the very narrow flutes of the shafts can and a low astragal. The architrave shows the taenia with regular and cylindrical drops attached to the surface of the architrave. Above this still remain 7 regular narrow triglyphs, lacking further details. The temple was famous for its splendid doors, that gleamed in gold and ivory, and for its panel pictures in the interior.

g. The clone may be formed by the Temple of Zeus in Akragas, striking by the peculiarity of the arrangement of its plan, a thoroughly mature creation of the same century.

The so-called Temple of Zeus in Akragas, a colossal work of antiquity, was a pseudoperipteral structure with 7 × 14 columns above a peculiarly treated substructure with an arrangem-

of the cornice, of the mutules and of the architrave, were p painted red, the mutules themselves, the triglyphs and the regulas were blue, while the drops remained white (probably originally gilded); the grooves of the triglyphs were made a dark blue-black.

s. The Temple of the so-called Juno Lacinia in Akragas is a peripteral building with 6 × 13 columns and is of moderate dimensions. The columns are slightly diminished; the echinus of the capital is boldly and nobly profiled, and decorated beneath by 3 annulets; the neck band consists of 3 incisions. The angle of the architrave is brought forward; the cornice and the ante capitals are lacking. The material is a yellowish porous limestone, now very much weatherwork, and formerly covered with stucco. Only 4 columns are wanting, and 16 still retain their capitals; the northern side still has its entire architrave and a few pieces of the frieze; otherwise, only a block of the architrave remains on the southern side. Fazell saw the temple while still complete, yet he complained of the shattered columns and the progressive dilapidation. The ruins received some repairs by Torremuzza in 1787.

t. As one of the ripest creations of the Dorism of the 5 th century B.C., O. Puchstein designates (p. 68) the Temple of Athena on Ortygia, now built into the Cathedral of Syracuse. The shafts of its columns consist of 3 drums, of unusually careful work, with a steep and almost straight line echinus with 3 broad and flat incisions between the very narrow fillets of the annular band and a low abacus. The architrave sh shows the taenia with regulas and cylindrical drops attached to the surface of the architrave. Above this still remain 7 rather narrow triglyphs, lacking further details. The temple was famous for its splendid doors, that gleamed in gold and ivory, and for its panel paintings in the interior.

u. The close may be formed by the Temple of Zeus in Akragas, striking by the peculiarity of the arrangement of its plan, a thoroughly mature creation of the same century.

The so-called Temple of Zeus in Akragas, a colossal work of antiquity, was a pseudoperipteral structure with 7 × 14 columns above a peculiarly treated substructure with an arrangem-

arrangement of piers on the wall and of semicircular recesses filled with series of acoustic jars as supporters of beams. (Plan in Fig. [illegible]). The columns were moderately diminished and stunny: 20 flutes were grooved for the complete column, and they were 1.40 ft. wide from edge to edge on the lowest drum: the entasis was high and steep, enclosed by 4 annulets and without any indentation at the meeting. The face of the architrave projects in front of the upper circumference of the column: the triglyphs and metopes were high and narrow, and the cornice was massive. The metopes were without sculptures, but so decorated by friezes, the tympanums were on the contrary most richly adorned by them. The height of the entablature does not the breadth of the column about 2 1/2 times. From the richly decorations of the temple, certain architectural members could no longer be made of single blocks: they were com-

[illegible]

bin and was composed of 3 courses of stones placed one upon the other, but the weights blocks of approximately equal heights were monolithic; the capitals, excepting the abacus, were made of two pieces of stone, each of which measured 3.55 m. ft.; the abacus consisted of 3 slabs placed side by side, and the frame of the columns and adjacent wall-sunned pieces. A man could comfortably place himself within a flute of the column.

The arrangement of the interior, the entrances and the mode of lighting, can no longer be determined with certainty.

The material employed is here again the light yellow fine-grained limestone, which was covered with stucco and painted. Its rich accidentens in paintings, statues and votive gifts, were reasonably mentioned by the ancients: Cartheniteis and Cloufiers, issued at Hieera, were employed in the erection of the temple. The temple was consecrated in all its parts, yet the destruction of the city by the Carthaginians (-409) hindered its construction. Its last portion remaining unfinished fell on Dec. 3, 1401: the mighty keep of ruins, the "Palace of the Giants", has since served as a source of supply of building stone; even in the year certuary, it furnished the

arrangement of piers in the cell and of severely treated Atlantes of archaic form as supporters of beams. (Plan in Fig. 369). The columns were moderately diminished and stumpy; 20 flutes were arragged for the complete column, and they were 1.80 ft. wide from edge to edge on the lowest drum; the echinus was high and steep, enclosed by 4 annulets and without any incisiin at the necking. The face of the architrave projects in front of the upper circumference of the column; the triglyphs and metopes were high and narrow, and the cornice was massive. The metopes were without sculptures, but as described by Diodorus, the tympanums were on the contrary most richly adorned by them. The height of the entablature goes into the height of the column about 2 1/2 times. From the mighty dimensions of the temple, certain architectural members could no longer be made of single blocks; they were composed of several courses; thoughrelatively still of great dimensions; thus for example, the architrave was 10.50 ft. high and was composed of 3 courses of stone placed one upon the other, but the triglyph blocks of approximately equal height were monolithic; the capitals, excepting the abacus, were made of two pieces of stone, each of which measured 536.8 cu. ft.; the abacus consisted of 3 slabs placed side by side, and the drums of the columns and adjacent wedge-shaped pieces. A man could comfortably place himself within a flute of the column.

The arrangement of the interior, the entrances and the mode of lighting, can no longer be determined with certainty.

The material employed is here again the light yellow fine-grained limestone, which was covered with stucco and painting. Its rich appointments in paintings, statues and votive gifts, were repeatedly mentioned by the ancients; Carthaginians and Siculians, taken at Himera, were employed in the erection of the temple. The temple was completed in all its parts, yet the destruction of the city by the Carthaginians (408) hindered its construction. Its last portion remaining upright f fell on Dec. 9, 1401; the mighty heap of ruins, the "Palace of the Giants", has since served as a source of supply of bubuilding stone; even in the past century, it furnished the

it furnished the materials for the mole of Gripseil (Ancient [illegible] [illegible] [illegible]

it furnished the materials for the mole of Girgenti.(Porto Empedocle).

Many small members here appear somewhat uncouth. But it should not be forgotten, that only the cut shapes of the architectural members appear to us.

To the possibility that we have before us a consecrating t temple (telesterion), Puchstein first referred. Diodorus (XIII, 82) states, that it had received no roof and also no ceiling, since the war then occurred, and then by the destruction of the city, there was no further opportunity. Its dimensions are given by Diodorus at 340 ft. long, 60 ft. (indeed 160) wide and 120 ft. high, aside from the foundations. It was the largest in Sicily, its columns were built into the walls, externally round and internally rectangular. Diodorus says nothing of the atalantes.

Since the condition of the western facade affords free scope for the imagination, then Holm and others (Geschichte Siziliens in Altertum. I. p. 298. Edit. 1870) first proposes to omit the middle column; assuming there as on the Propyleion of Athens a wide spacing of the front columns, whereby would be made possible the arrangement of a mighty entrance doorway 2 29.52 × 59.04 ft. in the clear, for example. Then an opening of 1743.12 sq. ft. would be obtained for the admission of the light, which in some degree would have lighted the interior by day. This assumption is forbidden by the eastern facade, by the parts of walls and trunks of columns still remaining, according to Puchstein's plan.(Fig. 154 in his book). Thus the great altar stood before the eastern end, which had no doorway. The contemporary inhabitants easily avoided the hard question of the lighting of the interior, since the ceiling and roof of the building were lacking. A doorway lintel with 29.52 ft. clear span was not possible with the material of which the temple was built. It could be made of dense limestone or granite. Architraves and beams over 19.68 ft. long are determined on the Acropolis of Athens, and also architraves of granite 29.52 ft. long in Luxor, which support loads in both cases. To lay the lintel on iron bars (armature) as Puchstein desires for the architrave, is not conceived in accordance with the antique.

Concerning the statuettes not mentioned by Ficorini, I could now guess, that the last section which left comparatively three colossal figures and several colonne. The temple was by human powers and the assistance of the materials. The work of removing the ruins commenced in 1[illegible]. Large lava since been found the remains of clever different colossal figures. At least the former existence of statues in the building is assured.

Winckelmann emphasizes in regard to them,"that it was no longer technically necessary for their backs to be fastened to the wall, and that they are to be recognized as structural members, rather their covering consisted of 12 layers in height. They were not conceived as giants, but as slaves." That they were composed of layers of stone makes them no longer "structural members." Compare the circumscribed colossal figures on the attic of the entrance facade of the Lateran in Rome, that are laid up in stone courses, and yet are not"structural members". The joints play no part, since they disappeared under the stucco coating. But they became such, as soon as they are components of the supporting courses of stone. A fact that is the case here.

Therefore the remains of statues found here in the interior have been restored as supporters of the ceiling beams of the middle aisle, starting on the internal piers of the aisle. Winckelmann attempts to employ them on the facade. Perhaps a artists did not shrink from the use of such massive colossal figures on the facades of inner temples, as those of Abu-Simbel, or the Ramesseum and Medinet Abu show. Certainly we have nothing to do with them with sculpting, but only with free figures leaning against the wall. They are not structural

of solemn effect. Why not then transform and utilize the figures motive in their sense?

"the function of the representation by Cockerell and others, "they lack all foundation and almost all analogy". With the objection in this sense I agree. Ficorini may be quoted against the representation of the exterior. He says somewhere

Concerning the atalantes not mentioned by Diodorus, Fazell now states, that the last portion which fell consisted of three colossal figures and several columns. The temple fell by human powers and the weathering of the materials. The work of removing the ruins commenced in 1802. There have since been found the remains of eleven different colossal figures. At least the former existence of atlantes in the building is assured.

Puchstein emphasizes in regard to them,"that it was no longer technically necessary for their backs to be fastened to the wall, and that they are to be recognized as structural members, whether their coursing consisted of 12 layers in height. They were not conceived as giants, but as slaves." That they were composed of layers of stone makes them no longer "structural members." Compare the detached colossal figures on the attic of the entrance facade of the Lateran in Rome, that are laid up in stone courses, and yet are not"structural members". The joints play no part, since they disappeared under the stucco coating. But they became such, as soon as they are components of the supporting courses of stone. A And that is the case here.

Heretofore the remains of atlantes found here in the interior have been restored as supporters of the ceiling beams of the middle aisle, standing on the internal piers of the aisle. Puchstein attempts to employ them on the facade. Egyptian a artists did not shronk from the use of such massive colossal figures on the facades of their temples, as those of Abu-Simbel, on the Ramesseum and Medinet Abu show. Certainly we have nothing to do with there with supporting, but only with free figures leaning against the wall. They are not structural members. Akragas likewise desired something extraordinary, of solemn effect. Why not thus transform and utilize the Egyptian motive in their sense?

What Puchstein sets araght by his procedure was the impossible basis of the representation by Cockerell and others. "T "They lack all foundation and almost all analogy". With the objection in this sense I agree. Diodorus may be quoted against the representation of the exterior. He says scarcely

[illegible] of the interior, which was not completed. He descri-
bes the capitals and the columns, and would not such strong-
ly contradicting "architectural memoirs" have struck only
superficies below the capitals, over them at least over-
ing and within the same one of the most effective ideas of ar-
chitecture architectures, -- the "[illegible] stands upright and sur-
porting the entablature", thus says Prokesch, and men will
be willing to agree with him.

The demonstration of his assumption Prokesch bases on the
original fallen position of the ruins of the temple, and he
assures that in those pieces which have remained unknown,
"sufficient" to be furnished to him a safe structure point for de-
termining the place formerly occupied in the building by the
other one.

According to the enumeration of the pieces found, that Pol-
lin and Cavalieri collected after the excavations of Vescili-
tano (p. 100), that then all sculptured blocks were carefully
displaced, that the principal pieces of the unknown Ionic
remaining were discovered on the southern side of the temple,
where on the ruins of the wall and between the piers of the
side by side the south still lay the right half of one of
the architrave courses of the antiques, the portion of an pa-
ler extending 1.[illegible] ft. into the wall, consisting thereon the
left lower arm with the palms of the hands lifted against
the wall. The arches and the head "appeared to be broken".

From the holes above, one must conclude that two rows of a
sculpture lay above it.-- The "holes", whose meaning is now re-
vealed and over estimated at every opportunity, as subordin-
ate arrangements for setting, do not prove much in the given
case. According to the depth of an [illegible], such [illegible]
for slitting it, but two or more would be required: therefore
one need not decide in the latter case on two sculpture lying
beside each other.

[illegible]
ed structure would drop out. The latter would be a [illegible]
[illegible]
[illegible] Ionic. It has in this case neither sense nor value.

anything of the interior, which was not completed. He describes the pediments and the columns, and would not such strongly participating"architectural members"have struck him? High enclosures below between the columns, over them an ideal opening and within the same one of the most effective ideas of antique architecture, -- the 38 giants standing upright and supporting the entablature", thus says Puchstein, and men will be willing to agree with him.

The demonstration of his assumption Puchstein bases on the original fallen position of the ruins of the temple, and he states that in those pieces which have remained untouched, "appears"to be furnished to him a safe starting point for determining the place formerly occupied in the building by the atlantes.

According to the enumeration of the pieces found, that Politi and Cavallari collected after the excavations of Serridifalco (p. 160), that then all sculptured blocks were carelessly misplaced, that the principal pieces of the untouched finds remaining were discovered on the southern side of the temple, where on the ruins of the wall and between the piers of the sixth bay from the south still lay the right half of one of the uppermost course of the atlantes, the portion of an ashlar extending 1.61 ft. into the wall, containing thereon the left lower arm with the palms of the hands placed flat against the wall. The elbows and the head "appeared to be broken".

From the holes above, one must conclude that two rows of a ashlars lay above it.-- The"holes", whose meaning is now repeated and over esteemed at every opportunity, as subordinate arrangements for setting, do not prove much in the given case. According to the depth of an ashlar, such might serve for sliding it, but two or more would be required; therefore one need not decide in the latter case on two ashlars lying beside each other.

To arrange one ashlar, where Puchstein attempts two, would technically be more rational, whereby the impossible so-called armature would drop out. The latter would be a patchwork in the style of the late Barocco period, but not an antique construction. It has in this case neither sense nor value.

Of the block in question it is further known, that it
had been placed externally on the wall. In the immediate
vicinity, there is known to have lain an architrave block with
an arrangement for ironwork and other architrave blocks. Moreover there was further noted further west a architrave block
between two capital blocks, probably of the sixth course with
the lower half of the echinus; also west of this and behind
the capital was a fragment of an abacus on the ground. These
like the first two [illegible] and [illegible] [illegible]

On the north the wall "probably" fell towards the interior of
the east and nothing more is to be recognized. All this is
extremely valuable and good.

But one must now clearly recognize at the eastern end of t
ing, and then now the upper heavy Doric (?) parts of the architrave were overturned, fell vertically, and in case the
in the ground with the façade.

From this is doubtless to be derived the conclusion, that
well, as well as on the owners, and that Cosgrovil and his re-
posters were of a false peak.

cept that the aid of iron now appears superfluous. Since the
architrae may be directly regarded as piers of courses of ash-
ies as the columns. Besides they were effectively relieved
(fig. 2?a). The assumed iron bars had no structural value,
neither by their form nor by the mode of their insertion and
must be twice as essential for the one next behind. The proper
for mortise, just as on the adjacent capital blocks.(fig. ?2).

Of the block in question it is further said,"that it so happened, that the sculptured side lies outside, as if the atlante had been placed externally on the wall. In the immediate vicinity, there is known to have laid an architrave block with an arrangement for ironwork and other architrave blocks. Likewise there was further noted further West a strethcher block between two capital blocks, probably of the sixth course with the lower half of the echinus; also west of this and behind the capital was a fragment of an atlante on the ground. These like the first had fallen with the front side toward the south".

On the north the wall"probably"fell towards the interior of the temple, or rather was overthrown. Everything is gone at the east and nothing more is to be recognized. All this is extremely valuable and good.

But one must now plainly recognize at the eastern end of t the still remaining portion of the south wall by the position of the ruins, how the wall was inclined to the south in falling, and then how the upper heavy Doric (?) parts of the entablature were overturned, fell vertically, and in case the small blocks of the lower structure were crushed, they are in the ground with the facade.

From this is doubtless to be derived the conclusion, that the atlantes stood externally between the columns on the south wall, as well as on the others, and that Cockerell and his repeaters were on a false path.

Nothing is to be objected to the stonecutting preferred, except that the aid of iron now appears superfluous. Since the atlantes may be directly regarded as piers of courses of ashlars, which were well bonded with the adjacent masonry, then they were just as good supports for the architrave and cornice as the columns. Besides they were effectively relieved by the peculiar coursing (corbelling) of the architrave blocks. (Fig. 372). The assumed iron bars had no structural value, neither by their form nor by the mode of their insertion and bearing. If they were necessary for the front course, they must be twice as essential for the one next behind. The grooves found on the lowest architrave blocks were arrangements for hoisting, just as on the adjacent capital blocks.(Fig. 72).

The position of the faces of the atlantes was found to be toward the south at the fall of the wall, rather been the contrary. Thus these pieces certainly were not displaced, but lie where the destroyers threw them: what "restoration" they attempt thus cannot be found and research out. One may [illegible]

[illegible] were otherwise in Sahure and on the Temple of Zoser in [illegible] of the matter.

We reproduce the cross section through the temple in accordance with the scale of the determined ground plan and the restored courses on the basis of the succession given by Puchstein in his drawings, thus a somewhat satisfying representation of the matter, in which I assume, that the thin wall between the atlantes did not extend to the ceiling, but was only carried as high as assumed by Puchstein for the lower portion of the external walls -- already on account of the internal effect, the entrance of light, and of analogies. (Wiegand, 291, 292).

At the same height established by Puchstein, I might have the atlantes toweed the middle aisle and allow them to support the capitals of the edges and piers. Thus would one obtain on the lower available resources for architrave art works, an enjoyable position of the atlantes, a correct height for the aisle piers and a subdivision of the supports in the nave of the temples at Karnak and on Karnak.

Did all this seem for A. Choisy in matters of architecture, who here (Hist. Arch. p. 422) assumes closed walls for the middle aisle and a raised middle aisle with atlantes next the ceiling. I cannot agree on this occasion with him. Up to the height of the pilasters or the inside of the outer walls of the temple, one can fully agree with Puchstein, and on the exterior up to the top of the cornice. What followed in the interior, we do not know. Nor ceiling and roof [illegible] longer existing in the remains of the building, and without which reflection generally becomes fancy. The covering of the middle aisle with stone beams 16:82 ft. long is excluded

The position of the faces of the atlantes was shown to be toward the south at the fall of the wall, rather than the contrary. Thus these blocks certainly were not misplaced, b but lie where the destroyers threw them; what "purzelbaum" they struck thus cannot be found and seasoned out..One may experience the strangest things in such cases. The conditions were otherwise in Selinus and on the Temple of Zeus in Athens, yet natural forces have there unitedly taken charge of the matter.

We reproduce the cross section through the temple in accordance with the scale of the dtermined ground plan and the restored courses on the basis of the suggestion given by Puchstein in his drawings, thus a somewhat assisting representation of the matter, in which I assume, that the thin wall between the aisle piers did not extend to the ceiling, but was only carried as high as assumed by Puchstein for the lower portion of the external walls -- already on account of the internal effect, the entrance of light, and of analogies. (Figs. 371, 372).

At the same height established by Puchstein, I might turn the atlantes toward the middle aisle and allow them to support the capitals of the antes and piers. Thus would one obtain on the floor available recesses for exhibiting art works, an enjoyable position of the atlantes, a correct height for the aisle piers and a subdivision of the supports in the sense of the temples at Paestum and on Egina.

With all high esteem for A. Choisy in matters of antique architecture, who here (Hist. Arch. p. 435) assumes closed walls for the middle aisle and a raised middle aisle with atlantes next the ceiling, I cannot agree on this occasion with him. Up to the height of the pilasters on the inside of the outer walls of the temple, one can fully agree with Puchstein, and on the exterior up to the top of the cornice. What followed in the interior, we do not know. For ceiling and roof can only be viewed possibilities, positive starting points no longer existing in the remains of the building, and without which reflection generally becomes fancy. The covering of t the middle aisle with stone beams 45.92 ft. long is excluded

as well as that of the side aisle with bays of 16.50 ft. from
axes. The connection of the piers in the direction of the
longitudinal axis would be proved sufficiently possible with
the materials elsewhere employed on the temple by the assimi-
lation of nonlocal arches, as on early Roman buildings (Rome,
-ceneil, Tivoli etc.), but otherwise only with "iron armatures"
that would have required a tolerable quantity of iron ties.
Let us rather leave this to wood here, but not with cross sec-
tions in the modern sense.

The closing of the aisles in the interior was something
in propriety at the time by placing together the corresponding
blocks found buried in the mass of ruins of the south
side bays of the aisles, the assumption and also the con-
struction formed by me at the time must fail. That the frag-
ments of the piers of the middle aisle have shrunk as much
as 4.50 ft. from their original position is indeed scarcely
credible.

Now the matter now rests is, that Puchstein's assumption,
based on the locality of the finds, has the greatest degree
of probability in itself, and it must be maintained, so long
as proof is not obtained to the contrary.

To approach closer to these great questions and to attract
this in worthy of the sweat of his brow, rather than to con-
tend about small things.

A concession in conclusion: -- I made my first reconnaissances
of the above ruins on the Temple of Zeus at Aragiza in Sept.
[illegible]
was in the first description of the temple, and I adhere to
them the more firmly, since later visits to the ruins have n
not permitted me to change any of them.

Masonry walls and supports are constructed of moderately l
large ashlar courses, the material being the sand had abolit
[illegible]-stone. Only the courses, the triglyphs and the cornice
blocks with the adjacent parts have an exception. Puch-
stein (p. 108) drawes as the greatest ashlars in the structure,
those in the architrave, 2.80 × 2.(0 × 3.84 ft. = 200.0 cu. ft.,
while the cornice block measure 1[illegible].2 × 4.[illegible] × 4.50 ft. = 302.
cu. ft., the triglyphs are 1[illegible].16 × 4.92 × 4.[illegible] ft. = 300.0 cu.ft.,

as well as that of the side aisle with beams of 39.36 ft. free span. The connection of the piers in the direction of the longitudinal axis would be proved sufficiently possible with the materials elsewhere employed on the temple by the assumption of horizontal arches, as on early Roman buildings (Rome, Pompeii, Tivoli etc.), but otherwise only with "iron armatures," that would have required a tolerable quantity of iron bars. Let us rather leave this to wood here, but not with cross sections in the modern sense.

The placing of the atlantes in the interior won something in probality at the time by placing together the corresponding blocks found buried in the mass of ruins of the south side parts of the atlantes, the assumption and also the conception formed by me at the time must fail. That the fragments of the piers of the middle aisle have strayed as much as 49.20 ft. from their original position is indeed scarcely probable.

How the matter now rests is, that Puchstein's assumption, based on the locality of the finds, has the greatest degree of probability in itself, and it must be maintained, so long as proof is not obtained to the contrary.

To approach closer to these great questions and to attempt this is worthy of the sweat of the noble, rather than to contend about small things.

A correction in conclusion; -- I made my first measurements of the stone ashlars on the Temple of Zeus at Akragas in Sept. 1876 at the locality and published them . They are again given in the first description of the temple, and I adhere to them the more firmly, since later visits to the ruins have n not permitted me to change any of them.

Masonry walls and supports are constructed of moderately l large ashlar courses, the material being the said bad shelly limestone. Only the cornice, the triglyphs and the echinus blocks with the adjacent necking form an exception. Puchstein (p. 163) gives as the greatest ashlars in the structure, those in the architrave, 8.80 × 7.00 × 3.54 ft. = 309.0 cu. ft., while the cornice blocks measure 12.2 × 4.98 × 4.60 ft. = 309. cu. ft., the triglyphs are 10.13 × 4.92 × 4.60 ft. = 300.0 cu.ft.,

and the central block (0.64 x 5.07 x 2.40 m. = 8?.0 cu. ft. The blocks all have square grooves for binding, 4.86 x 4.[illegible] and 5.05 x 4.04 ins. in width and depth.

[illegible]

and contemporaries belong to the Ionic and Corinthian orders.

The refinements of the details, of bases, capitals and cornices required a finer material. If in Sicily and southern Italy Ionic capitals of porous limestone with stucco coating indeed exist, yet by far the greater number of Ionic and Corinthian temples are constructed of dense or crystalline limestone, i.e. of white marble. On the old-est Greek Ionic building on Italian soil -- in Locri -- was employed dense limestone, as well as for the Doric-Corinthian in Paestum.

To conclude from the facts, as Pace "some old architects" (Vitruvius. IV. Chap. 3, 1) like Iaroseios, Pytheos and Ionas Ferrogenos still appear to have been firmly of the opinion, that no further temples of the Doric order should be [illegible] tions of the members could not be avoided.

Greater generals from the followers of Alexander the Great found-fourth rule in Mesopotamia, Syria and Egypt. Here Sinope became the chief emporium of Greek culture and art, a rich and magnificent architectural period ensued, in which the [illegible] numerous excellent temples in their monumental works.

Alexandria in Egypt and Antioch on the Orontes were [illegible] Pergamon and Ephesus were great cities of the later Greek [illegible] in Pergamon their magnificent residence city.

Besides these chief localities, there smaller cities were not inferior in their architectural offerings, as still shown by the buildings in Priene and many other places.

As a building material there predominated in all the white crystalline limestone (marble). In architecture perfection and skill in construction, they excel everything equalled, and also frequently in magnitude and grandeur of appearance. Thus for example, the greatest temple in Asia Minor; the Olympieion near Vilenos ([illegible] x [illegible] ft), one ancient Heraion at Samos,

and the capital blocks 10.54 × 5.07 * 8.80 ft. = 537.0 cu. ft. The blocks all have square grooves for hoisting, 4.85 × 4.85 and 5.05 × 4.04 ins. in width and depth.

V. On the Attic Doric marble buildings, whose prototypes and contemporaries belong to the Ionic and Corinthian orders.

The refinements of the details, of bases, capitals and cornices required a dense material. If in Sicily and southern Italy Ionic capitals of porous limestone with stucco coating indeed exist, yet by far the greater number of Ionic and Corinthian temples are constructed of dense or crystalline limestone, i.e. of white marble. On the oldest Grecian Ionic building on Italian soil -- in Locri -- was employed dense limestone, as well as for the Doric-Corinthian in Paestum.

To conclude from the facts, in time "some old architects" (Vitruvius. IV. Chap. 3, 1) like Tarchesios, Pythios and no less Hermogenes still appear to have been firmly of the opinion, that no further temples of the Doric order should be built, since in such works defective and inharmonious proportions of the members could not be avoided.

Grecian generals from the followers of Alexander the Great thenceforth ruled in Mesopotamia, Syria and Egypt. Asia Minor became the chief supporter of Grecian culture and art, a new and magnificent architectural period ensued, in which the new monarchs excelled themselves in their monumental works.

Alexandria in Egypt and Antiochia on the Orontes were prominent localities of Grecian civilization; Syracuse, Magnesia, Miletus and Ephesus were great cities of the later Grecian world. On the western coast of Asia Minor, the Attalides founded in Pergamon their magnificent residence city.

Besides these chief localities, three smaller cities were not inferior in their architectural offerings, as still shown by the buildings in Priene and many other places.

As a building material there predominated in all the white crystalline limestone (marble). In artistic perfection and skill in construction, they excel everything earlier, and also frequently in magnitude and grandeur of appearance. Thus for example, the greatest temple in Asia Minor; the Didymaeon near Miletus (858 × 164 ft), the ancient Heraion at Samos,

(360 × 181 ft.), the Prytaneion at Ephesus (240 × 164 ft.) -- of the Ionic order.

To the same school belong the temples in Priene, Ephesus and Didyma. The one first mentioned must indeed have furnished the model for those succeeding it.

[illegible] cornice, the ceilings of the portico (peripteral), the columns in the interior are of dense white stone, without stucco and less richly ranged than the Doric, only the ceiling of the cell and the framework of the roof with the rafters being of wood. Nearly perfect monumental effect is attained also by these Ionic buildings.

Among the oldest prominent temples of the Ionic style are to be reckoned those at Samothrace and Samos, both dating from the 7 th century B.C., the ancient Heraion at Samos, as well as the Apollonion at Ephesus, both referred to the 6 th century B.C., and then the Temple at Cori belonging to the 5 th century. These are followed in time by the Ionic buildings in Attica and of the Alexandrine period there and in the lands before mentioned. The combination is formed by those erected under Roman rule, as the last expression of the development of the pure Ionic Greek style; the buildings of Asia Minor, that from Aphrodisias showed assumed the leading part in Roman architecture, which echoes the preference for the Corinthian and Composite orders.

As the more prominent examples are to be mentioned in detail:--

1. Relating to the Temple of the Ionic order in Samothrace, [illegible] pre, dedicated to Apollo, shows in its fragments of fluted a and slightly diminished shaft, the Samian case of architecture with a heavy round ornamented by scales and beads above the round moldings of the flutes, above which, as in Samothrace capitals, is given a kind of echinus band with corinthian recurved leaves, on which the volute bracket must have rested. The upper portion will ever not be unlike the above capital from the Athenian acropolis.

[illegible] Temple, with chapters by Smith, E. Gardner and Fowler V.

(360 × 181 ft.), the Artemesion at Ephesus (343 × 164 ft.) -- of the Ionic order.

To the same school belong the temples in Priene, Ephesus and Didyma. The one first mentioned must indeed have furnished the model for those succeeding it.

The stylobate, cell walls, columns, architrave, frieze and cornice, the ceilings of the porticos (peripteral), the columns in the interior are of dense white stone, without stucco and less richly painted than the Doric, only the ceiling of the cell and the framework of the roof with the rafters being of wood. Nearly perfect monumental effect is attained also by these Ionic buildings.

Among the oldest prominent temples of the Ionic style are to be reckoned those at Nearchia and Naucratis, both dating from the 7 th century B.C., the ancient Heraion at Samos, as well as the Artemesion at Ephesus, both referred to the 6 th century B.C., and then the Temple at Locri belonging to the 5 th century. These are followed in time by the Ionic buildings in Attica and of the Alexandrine period there and in the lands before mentioned. The conclusion is formed by those erected under Roman rule, as the last expression of the development of the pure late Grecian style; the buildings of Asia Minor, that from Augustus onward assumed the leading part in Grecian architecture, which echoes the preference for the Corinthian and Composite orders.

As the more promenent examples are to be mentioned in detail;--

1. Relating to the Temple of the Ionic order in Naucratis, Gardner published some remarkable details. [1] This archaig temple, dedicated to Apollo, shows in its fragments of fluted a and slightly diminished shaft, the Samian base of archaic ch character with a heavy found ornamented by scales and beads above the round endings of the flutes, above which, as in Phoenician capitals, is given a kind of echinus band with overlapping recurved leaves, on which the volute bolster must have rested. The upper portion will then not be unlike the stele capital from the Athenian acropolis.

*Note 1. See Naucratis. Part 1. 1884-5. By W. M. Flinders-Petrie, with chapters by Smith, E. Gardner and Barklay V.*

*Head. Third Memoir of Egypt. Expl. Fund. London. 1886. Pls. 3, 4; also Part 2 by Gardner with an Appendix b: F. Ll. Griffith. Sixth Memoir of Egypt. Explor. Fund. London. 1888. Also see the original finds in the British Museum in London.*

Other portions exhibit the necking ornamented by anthemions without a separating pearl bead and with the like arrangement of the flowers as on the Temple in Locri.

The second Temple of Apollo there shows in its fragments the pearl bead and scale border beneath the anthemion.

2. The Temple in Neandria on the Tschigri-Dag, where Clarke found the peculiar Ionic capital was regularly excavated by Koldewey. It consists of a substructure 42.21 × 84.33 ft., on which stood the cell without external columns, enclosing a room 26.64 × 65.01 ft., which was divided into two longitudinal aisles of equal width by a central row of columns, 7 in number. The foundation was placed on the solid rock and is composed of two courses of irregular stones, separated from the regular masonry by an interposed course of stretchers 0.66 ft. thick. But the foundations of the columns are of granite blocks, while the columns themselves are of Liparite, The floor of the cell was 1.25 ft. below the threshold of the doorway; one must therefore have descended into the Temple. Access to the cell was afforder by a doorway 4.17 ft. wide, whose threshold was at the same height as the external pavement. From the fragments discovered, Koldewey succeeded in d determining the form of the interior, the ceiling, and the columns supporting the roof, which especially recalled Egyptian columns. The capitals are composed of a series of leaves, cymatium and volutes, and crown the plain and strongly diminished shafts without bases, whose lower diameter is 1.74 ft. and upper is 1.31 ft. The capitals are not alike and also do not show the same treatment of the front and rear faces. The former must therefore have been turned toward the entrance, since they exhibit the more perfected style. The capital with ascending volutes above a cymatium ornamented by leaves is then established in three places, in Columdada, Aegae, and Na Neandria, and it is to be termed Aeolic-Ionic. The horizontal Ionic volute is then contrasted with the vertical Aeolic,

to which should be added a third form, the Doric, the Ionic interwoven [illegible] existed at the same time and independently of the Aeolic Ionic; "they are three branches from the same stem, of which the Aeolic bloomed earlier and withered". The capital from Sogbar-Koi cited by Puchstein may be regarded as the parent of all.

The ground plan shows the most intimate connection with the so-called Basilica at Baccum; Also the old temple in Lesbos had the same form, in which we must recognize the oldest form of temple.

The architrave, cornice, ceiling and roof were of wood. A main longitudinal beam was supported by the columns, and the transverse beams then rested on this and on the walls, even if the ceiling and roof did not coincide, when the columns supported the ridge-beam. The volutes were therefore placed [illegible]

[illegible]

[illegible] ing a a matched margin with peculiar water grooves. The ridge [illegible] the fragments found, as on the Heraion at Olympia, while the hollow tiles were closed on the edge of the gutter and showed sculptures on the closing surfaces. A cyma ornamented by an small figures extended along the pediment, recalling the similar treatment on the older Artemesion in Ephesus.

[illegible] omitted, on account of the similarity of the capitals.

E. Temple of the Ionian Apollo on Lesbos, whose remains were removed and built into later structures. The very archaic volute capitals are of the highest interest for the history of art, and five examples of them were built into the old Church of Taxiarchis. The spiral lines are here intwine [illegible] [illegible] to the capital from Neandria published by Clarke.

to which should be added a third form, the Cypriote intersecting volute. According to these discoveries, the Aeolic type existed at the same time and independently of the archaic Ionic; "they are three branches from the same stem, of which the Aeolic bloomed earlier and withered". The capital from B Boghaz-Koi cited by Puchstein may be regarded as the parent of all.

The ground plan shows the most intimate connection with the so-called Basilica at Paestum; Also the old Temple in Locri had the same form, in which we must recognize the oldest form of temple.

The architrave, cornice, ceiling and roof were of wood. A main longitudinal beam was supported by the columns, and the transverse beams then rested on this and on the walls, even if the ceiling and roof did not coincide, when the columns supported the ridge-beam. The volutes were therefore placed at right angles to the longitudinal beam, just as on the Persian capital, the beam resting between the projecting bulls and not on them.

The covering of the roof consisted of flat red tiles 1.74 × 2.76 pt., with hollow tiles to match, the lowest course having a n upturned margin with peculiar water spouts. The ridge was covered by hollow tiles, which had a finial according to the fragments found, as on the Heraion at Olympia, while the hollow tiles were closed on the edge of the gutter and showed sculptures on the closing surfaces. A cyma ornamented by sm small figures extended along the pediment, recalling the similar treatment on the older Artemesion in Ephesus.

Among the temples mentioned, that on Lesbos should not be omitted, on account of the similarity of the capitals.

3. Temple of the Napean Apollo on Lesbos, whose remains w were removed and built into later structures. The very archaic volute capitals are of the highest interest for the history of art, and five examples of them were built into the old Church of Taxiarchis. The spiral lines are here likewise drawn with a free hand, and their radii of curvature do not diminish uniformly. The capitals exhibit a great similarity to the capital from Neandria published by Clarke.

The shafts of treasury that have been found, 28 in number, [illegible] ft. The [illegible] them consist of of a great torus of segmental form and a smaller astragal above it with the scoppige of the shaft.

7. The Heraion at Samos was dipteral with 70 columns according to some, according to others a pseudodipteral structure with wooden beam ceiling in panels. Several marble bases of columns are still preserved in their old places; others lie [illegible] flutes below, the diameter of the column is 7.41 ft.; [illegible] ceiling.

As on the Erechtheion and other monuments, the capital was [illegible] is indeed the earliest Ionic stone monument of importance.

8. The Temple in Doeri. On the site of an earlier temple of an order no longer to be determined, stood the peristeral [illegible] external layer, but were doubled and clamped together at the angles. The surrounding portico had 6 × 17 columns, which [illegible] mer being 10.4 and the latter 8.88 ft.

Pronaos, opisthodome, and also the portico, had pavements of stone slabs laid on a grating of beams. No stone of the cell wall now remains in place, and only mere fragments of the columns are to be found. Their bases recall by their form those of the Heraion on Samos; the shaft is covered by shallow flutes ending in semicircular form, above which is a moulding ornament of anthemions. While on the Erechtheion this is separated from the flutes by a pearl bead, we find in Locri a connection of these with the anthemion, since their do downward points lie in the spandrels of the arc. Above each rillet rises either a lotus or a palm leaf. The anthemions were painted, and the underside of the slab over the moulding was red, while the ground was generally left white, the edges of the lotus flowers were colored red, as well as the points

The shafts of trachyte that have been found, 23 in number, have diameters of 1.64 to 2.33 ft. The bases belonging to them consist of of a great torus of segmental form and a smaller astragal above it with the apophyge of the shaft.

4. The Heraion at Samos was dipteral with 10 columns according to some, according to others a pseudodipteral structure with wooden beam ceiling in panels. Several marble bases of columns are still preserved in their old places; others lie scattered around. The bases are archaic and heavy, with a fluted bolster below, the diameter of the column is 7.41 ft.; the capital shows a Doric echinus with a carved egg-and-dart moulding.

As on the Erectheion and other monuments, the capital was composed of two pieces in height. In any case, the building is indeed the earliest Ionic stone monument of importance.

5. The Temple in Locri. On the site of an earlier temple of an order no longer to be determined, stood the peripteral building with an elongated cell, pronaos and oposthodome, on a substructure of three steps, whose blocks were in a single external layer, but were doubled and clamped together at the angles. The surrounding portico had 6 × 17 columns, which were connected with the stylobate by dowells. The intercolumniations between axes differed on the ends and sides, the former being 10.4 and the latter 8.66 ft.

Pronaos, opisthodome, and also the porticos, had pavements of stone slabs laid on a grating of beams. No stone of the cell wall now remains in place, and only mere fragments of the columns are to be found. Their bases recall by their form those of the Heraion on Samos; the shaft is covered by shallow flutes ending in semicircular form, above which is a necking ornament of anthemions. While on the Erectheion this is separated from the flutes by a pearl bead, we find in Locri a connection of these with the anthemion, since their do downward points lie in the spandrels of the arc. Above each fillet rises either a lotus or a palm leaf. The anthemions were painted, and the underside of the slab over the necking was red, while the ground was generally left white, the edges of the lotus flowers were colored red, as well as the points

of the covering leaf, from which the palm leaf springs.

of antes are exhibited in the National Museum in Naples.

8. The Antipsecion in Olympia was a circular building surrounded by columns, according to Pausanias, whose map was f ioned by a bronze copy-head, that held the beams together.

The German expedition described the circular portico as belonging to the Ionic order.

The restoration shows the temple or rather the Heroon as a circular peripteral structure of 18 columns and with a diameter of 60.88 ft. These marble steps formed the visible substructure, while the exclusive walls consisted of porous stone. The bases of the columns exhibit a simplified Attic-Ionic design in the mouldings; the sculpture and the apple flowers beneath. The architrave is wrought from the same block with the" frieze, and the cornice has dentils. The cyma was of marble, decorated by lions' heads and crowned by palm-shaped antefixes. The roof was covered by clay tiles, the portico being

nal wall was subdivided by 18 Corinthian half columns. The ornamental forms were nearly all produced by painting, as well as the decorative details of the coffers. The colors

ition Adler, Fig. 278).

For this Tholos (Philippeion), Adler is guided by a correct architectural invention, and carries the cell structure higher than the annular portico in order to obtain a not too great roof surface. For the building allied in plan, the Tholos at

places the portico and cell beneath a common conical roof, and trains the internal room after the precedent of the so-called Temple of Vesta at Tivoli by oblong windows in the side. Perhaps he was led to this assumption by the recently

(See Fig. 279).

7. The Temple of Zeus Agoraios on the Kerameikos in Athens,

turned downward toward the fillets between the flutes, the palm leaves were entirely red, as well as merely the margin of the covering leaf, from which the palm leaf springs.

The original fragmants found of the capitals of columns and of antes are exhibited in the National Museum in Naples.

6. The Philippeion in Olympia was a circular building surrounded by columns, according to Pausanias, whose apex was f formed by a bronze poppy-head, that held the beams together.

The German expedition described the circular portico as belonging to the Ionic order.

The restoration shows the temple or rather the Heroon as a circular peripteral structure of 18 columns and with a diameter of 50.62 ft. Theee marble steps formed the visible substructure, while the enclosing walls consisted of porous stone. The bases of the columns exhibit a simplified Attic-Ionic design in the mouldings; the echinus and the angle flowers below the single channeled volutes of the capital are left smooth. The architrave is whought from the same block with the frieze, and the cornice has dentils. The cyma was of marble, decorated by lions' heads and crowned by palm-shaped antefixas. The roof was covered by clay tiles, the portico being ceiled with stone slabs with trapezoidal coffers. The internal wall was subdivided by 12 Corinthian half columns. The ornamental forms were nearly all produced by painting, as well as the decorative details of the coffers. The colors themselves could no longer be determined. (See restoration after Adler, Fig. 373).

For this Tholos (Philippeion), Adler is guided by a correct architectural invention, and carres the cell structure higher than the annular portico in order to obtain a not too great roof surface. For the building allied in plan, the Tholos at Epidauros, on the contrary Kabbadias (Praktika. 1907. p. 185) places the portico and cell beneath a common conical roof, and lights the internal room after the precedent of the so-called Temple of Vesta at Tivoli by oblong windows in the sides. Perhaps he was led to this assumption by the recently determined windows of the eastern cell of the Erechtheion. (See Fig. 374).

7. The Temple of Nike Apteros on the Acropolis of Athens,

a tetrastyle amphiprostylic structure on a white marble substructure of three steps.

The cella is lighted by small [illegible] and is open on the eastern end; two narrow piers form the pilasters of the doorway; the side openings were closed by grilles, whose marks still remain. Similar grilles were on both sides of the eastern prostasis between the angle column and the antas. The internal walls appear to have had paintings; the dressings of the painted cornices of the architrave, ante capitals, cornices and coffers may be still recognized in the incised outlines, while the colors have themselves vanished.

The columns are strongly diminished and have 24 flutes; the entablature goes 3 1/2 times into the height of the column; the height of the architrave is less than the lower diameter of the column. The intercolumniation is 5.18 ft. The frieze is decorated by [illegible] [illegible] columns.

Spon and Wheeler saw the little temple while in its original form; it was torn down by the Turks soon after the visit of these travelers. Its restoration was commenced in December, 1885, under the direction of Hansen, Foss and Schubert, and it was completed in the following year. According to Wolters the temple on this is later.

7. The Temple on the Ilissos near Athens was about equal [illegible] style building, only somewhat longer in proportion to its width.

[illegible] capitals of beautiful design, the bolster joining the volutes was gently curved downward. The architrave was not subdivided [illegible] and the entire entablature was somewhat heavy in proportion to the columns.

The little temple was built of white marble, and it was vastly admired, until the time of Hansen, but was unnecessarily torn down; not a vestige of it can now be seen.

[illegible]

a tetrastyle amphiprostyle structure on a white marble substructure of three steps.

The cell is built in small dimensions (12.40 × 13.74 ft.) and is open on the eastern end; two narrow piers form the sides of the doorway; the side openings were closed by grilles, whose marks still remain. Similar grilles were on both sides of the eastern prostasis between the angle column and the antes. The internal walls appear to have had paintings; the drawings of the painted ornaments of the architrave, ante capitals, cornices and coffers may be still recognized in the incised outlines, while the colors have themselves vanished.

The columns are strongly diminished and have 24 flutes; the base is without plinth and the capital without necking. The entablature goes 3 1/2 times into the height of the column; the height of the architrave is less than the lower diameter of the column. The intercolumniation is 5.18 ft. The frieze is decorated by figures; the ceiling beams rest directly on the columns.

Spon and Wheeler saw the little temple while in its original form; it was torn down by the Turks soon after the visit of these travelers. Its restoration was commenced in December, 1835, under the direction of Hansen, Ross and Schaubert, and it was completed in the following year. According to Wolters, Cimon was the builder of the "nikepyrgos" (substructure), while the temple on this is later.

7. The Temple on the Ilissos near Athens was about equal to the latter in size; it was likewise a tetrastyle amphiprostyle building, only somewhat longer in proportion to its width.

The columns were a little stumpy, the bases archaic, the capitals of beautiful design, the bolster joining the volutes was gently curved downward. The architrave was not subdivided into three parts; frieze and cornice were without ornament, and the entire entablature was somewhat heavy in proportion to the columns.

The little temple was built of white marble, and it was very well preserved until the time of Stuart, but was afterwards torn down; not a vestige of it can now be seen.

8. The Erechtheion in Athens, the most beautiful and comp-

comparatively the best preserved monument of the Doric order [illegible] [illegible] [illegible]

comparatively the best preserved monument of the Ionic style on the Acropolis at Athens, has on the east a hexastyle portico, on the west being 4 engaged columns between angle pilasters with 3 windows in the middle of the intervals between t the columns. This arrangement of half columns on a high substructure, so that the bases of the half columns are higher than those of the eastern portico. The design resulted from the peculiarities of the site. Not far from the western wall, there is on the northern side the magnificent doorway, and b before this is a large porch with 4 columns in front and 2 on each side. These columns are taller than those of the eastern side. The southern side is on the same level with the eastern portico and has a spearate projection, consisting of a high substructure on which 6 caryatids (4 in front) support an elegant entablature and a ceiling with coffers. The interior has not yet been sufficiently explained in all its parts, to which difficulty the obscurities in the description by Pausanias and the various additions of a later time have contributed not a little. Restorations of the building were published by Tetaz, Hansen, Bötticher, and Niemann. Julius also undertook one. [1]

*Note 1. Baumeister. I. p. 484-491.*

Least fortunate appears what Dörpfeld has published thereon quite recently, also opposed by Upper Building Councillor and Professor Reinhardt in Stuttgardt in the Süddeutschen Bauzeitung.(No. 50. 14 th year. Munich. Dec. 1904).

Pausanias calls this white marble monument the Erechtheion, stating it to have been a double temple, in whose inner part was a spring of salt water, agitated during the blowing of the south wind, on whose rock floor might be seen the marks of a trident, signs made by Neptune to show that the country belonged to him. Here was also worshiped the most sacred ig image of Athena, that fell from heaven; here stood the golden lamp of Callimachos, which burned continuously for a year with a single filling of oil and a wick of "Carpasian"flax; the smoke escaped through a bronze palm trunk extending to the c ceiling. In the cell of Athena Polias was the consecrated gift of Cecrops, the wooden Hermes, scarcely visible for mur-

myrtle branches; articles from the booty of the Medes were also laid up there; the sacred olive tree, the evidence of the competition of the goddess for the country, put forth its branches in the Pandroseion. The Cecropion adjoined the western portion of the temple, and the graceful caryatid portico had its front toward the south.

Under the olive tree stood the altar of Zeus Herkios; in t in the interior were various altars, where sacrifices were offered to Erechtheios, to the hero Bootes and to Hephaistos. The walls were decorated by paintings relating to the family of Butades. The colored ornamentation of the different architectural members has already been mentioned. The building shows two different times of erection, as discovered by Chandler and proved by an inscription tablet brought to England, on which are inscribed collections for the still unfinished portions of the temple.

The incsriptions recently found are interesting, and which were discovered by Ross in 1835-1836 beneath the ruins of the great battery in separate pieces, since they contain accounts for the completion of the building and afford in regard to the painting in particular, wages for sewyers, burners-in (encaustic painting), gilders, day laborers, sculptors, modelers, who furnished wax models, bronze-workers, who executed the ornaments of the coffers, superintendents, etc., are entered thereon; payments for the purchase of gold and of lead are recorded on them.

The temple is not entirely built of Pentelican marble, while the frieze of dark Eleusinian stone, the sculptures of this frieze and the roof tiles were of Parian marble. The foundations are built of porous stone; the roofs were made of wood, as proved by gains cut in some roof slabs. Tetaz assumes th that the roof slabs did not here rest on the rafters directly, but on a strong sheathing of boards. The gutters had a painted ornament, whose preliminary outlining with the point is still to be recognized. The proportions, mouldings, and treatment of the details belong with the noblest, most beautiful, and richest in antique art.

During recent years and under the higher direction of Dr. Kabbadias, general director of the Museum, by chief engineer

thus left uncovered, as it must have been originally.(fig. 2?). The two window enclosures near the entrance doorway to the Eastern cell were reset on this occasion, the external walls were consolidated, but valuable starting points for the internal treatment were not established. With closer study, the building efforts aesthetically and practically still numerous puzzles, that cannot yet be solved without further information. Less on the eastern side, but so much the more on the western facade, with the interior of the north portico and the added caryatid porch.

[illegible] easily ignored, as the problematical is more or less shifting-[illegible]

especially for the purpose of an accurate representation of the normal condition, does not say. The surfaces of the angle of the wall still near the setting losses, and also they are not finished. They are not formed like antes; the antecent pier without a beak. The pier of the caryatid porch has no connection with the cell masonry, the cornices of the portico project plainly beyond the angle of the temple.

The front surfaces of the architrave are in a plane with the shafts of the columns, but not with the angle pieces, whose faces project about one-third of the thickness of the half c columns.

The restoration also extended the pediment ends, which was not otherwise possible, after the extension of the eastern wall.

The pediment end block is set normal, and the main cornice is likewise normally moulded and developed on both sides.

A block with the inclined pediment (cornice 3) wrought on it is proved. The angle block of the frieze is restored, i.e. wrought on the existing block, and the decorated architrave

Balanos in Athens the fallen blocks were restored to their ancient places in the building, the broken marble beams being strengthened by iron, and the north portico was furnished with a protecting slate (!) roof. The opaion (skylight) was thus left uncovered, as it must have been originally.(Fig. 375). The two window enclosures near the entrance doorway to the Eastern cell were reset on this occasion, the external walls were consolodated, but valuable starting points for the internal treatment were not established. With closer study, the building affords esthetieally and practically still numerous puzzles, that cannot yet be solved without further information. Less on the eastern side, but so much the more on t the western facade, with the interior of the north portico and the added caryatid porch.

In the well known general views, certain details are mostly easily ignored, as the problematical is more or less skilfully evaded. First take the southwest angle. Is the connection with the caryatid porch there technically or esthetically perfect? Fig. 376 here, drawn by me in the spring of 1906 especially for the purpose of an accurate representation of the actual condition, does not say. The surfaces of the angle of the wall still bear the setting bosses, and thus they are not finished. They are not formed like antes; the anthemion ornament and the moulding is carried around to the adjacent pier without a break. The pier of the caryatid porch has no connection with the cell masonry, the cornices of the portico project plainly beyond the angle of the temple.

The front surfaces of the architrave are in a plane with t the shafts of the columns, but not with the angle piers, whose faces project about one-third of the thickness of the half c columns.

The restoration also extended the pediment ends, which was not otherwise possible, after the extension of the eastern wall.

The pediment end block is set normal, and the main cornice is likewise normally moulded and developed on both sides.

A block with the inclined pediment (cornice ?) wrought on it is proved. The angle block of the frieze is restored, i.e wrought on the existing block, and the decorated architrave

[illegible] (
[illegible] the [illegible] [illegible] [illegible]

is continued to the angle of the frieze. The mouldings of t the pier capitals of the northwest angle abut against the wall surfaces and are not returned. The piers of the north portico with double antes stand about 2 1/2 ins. behind the piers of the western facade; its moulding is broken around the projection and stops on the short piece of wall. The angle stone exhibits traces of the bed of a stone, but the edge is again cut obliquely, and not as the starter of a pediment. The two Figs. 377 and 378 give a general view of the angle in its present condition.

What was the solution here? From the preceding statements it may be attempted. What has been undertaken before gives a false conception. The skylight in the ceiling of the portico on the north in the restoration was produced by the lack of a ceiling coffer on the basis of corresponding finds. How it was further treated through the attic is uncertain. There are also persons, who do not believe at all in the skylight.

In the small pamphlets of W. R. Lethaby (Greek Buildings represented by fragments in the British Museum. IV. The Theseum, the Erechtheum and other works. London. 1908). position is also taken on the question of the original form of the bu building, reference being there made to the finds in the said Museum (a caryatid, a column, an ante capital etc.). In the plan of the location (Fig. 159) is entered in black, what is certain from the remains of the building. A Choisy (p. 432) gives a grond plan with a perspective section of the design of the cell. The two stairways placed in the eastern cell a and leading downward are indeed no longer to be retained, si since the windows beside the entrance doorway have been determined. A connection of the higher and lower cells does not seem necessary in general.

A representation of the north side in its existing condition is given by Fig. 379, from which the difference in the heights of the ground may be readily seen.

10. The Temple of Athena Polias at Priene was peripteral with 6 × 11 columns and was built by Pythios in 340 B.C.

It was still standing in the Christian period, but was destroyed in the 7 th century A.D. by an earthquake. It was excavated in the years 1868-1869 by R. P. Pullan, but it was

destroyed in 1870 by the villagers on account of the finding of silver coins, and with the other buildings of the city and its dwellings was taken up anew by the Prussian government. "On Oct. 29, 1894, Kekule and Humann, on the return from Miletus and Didyma to Sokia, went aside to Priene with the cherkess (guard) Jussuf and remained there several hours, astonished by the richness and the refinement of the ruins there." The excavations were commenced on Sept. 18, 1895. On Oct. 5, 1896, they were continued by Th. Wiegand and Hans Schrader, and the results were laid down and published in the beautiful work of the Royal Museum in Berlin:-- Priene, Results of the Excavations and Investigations in the years 1895-1898 by Th. Wiegand and Hans Schrader with the aid of G. Kummer, W. Wilberg, H. Winnefeld, R. Zahn.(Berlin. 1904).

The Temple was built of coarse-grained bluish-gray marble from the quarry of Mycale, and founded on the rock 6.56 ft. deep; the cell walls are 1.48 ft. thick and the doorway lintel is 4.75 ft. long. The columns are vertical and are not inclined toward the cell wall, as Vitruvius desires.(III, 5, 4). The pavement of the portico is inclined, but is made horizontal for the columns. The execution is careful; the beds of the columns are polished, the ashlars are joined by U-clamps, the fluted shafts of the columns are composed of several drums, the capital being without a necking member. The architrave is in three bands and is decorated by fillets with cove, cyma and beaded astragal. The main cornice has dentils, and the cyma is ornamented by scrolls and lions' heads. Nothing of the frieze was found, which led to the assumption, that it had never existed. This conclusion can be contested.

11. The Temple of Apollo Didymaeos in Miletus, made famous by its very ancient oracle, was burned by Darius, then perhaps restored, entirely destroyed by Xerxes, and again rebuilt after the war for freedom. The portions now remaining to us date from the Alexandrine period and are contemporary with those of the Artemesion at Ephesus and that at Magnesia-a-M. The Alexandrine temple was built by the architects Daphnis from Miletus and Päonios from Ephesus. Vitruvius counts it with the Ephesian Artemesion, the Temple of Demeter at Eleusis,

the Temple of Zeus at Olympia, as being the four most beauti-
ful [illegible]. [illegible] Pausanias describes it as unfinished.

It was still standing in the 5 th century A.D. and was prob-
ably destroyed by an earthquake.

An avenue for processions commencing circuing lions and
seated statues led to the Temple. The statues are now placed
in the British Museum. Two fluted marble columns with a cor-
nice block and a perfect column 8.50 ft. in lower diameter a
and 6.50 ft. high are still standing, together with a part
of the architrave. Of artistic interest are the capitals dis-
covered 12 years since with busts of the gods in the volutes
and a bull's head at the middle of the connecting molder.
(1907). The frieze was ornamented by great Medusa heads with
[illegible]
1.14 ft. wide and 1.20 ft. high with a proportion of 1.27 ft.
[illegible]
bers with a frieze of lyres and griffins between the pilaster
capitals.

French investigators gave us further explanations relating
[illegible]
of C. Bayet and A. Thomas:-- Milet et la Golfe Latmique. Pa-
[illegible]
Familles de 1895 et 1899. Paris. 1904). The entire uncover-
ing and raising of the ruins is now undertaken by the Prussi-
an government, which has purchased a number of the houses of
the village of Germna covering the site of the temple and
has partly removed them.

Fig. 351 gives a representation of the plan. Concerning
the works in progress, see the Report of the Excavations of
[illegible]
[illegible]
[illegible]
ish dense limestone as in Greece and Persemon) by the archi-
tect Hermogenes. A pseudodipteral structure on a substruct-
ure of 5 steps, it exceeded in magnitude all temples in Asia,

the Temple of Zeus at Olympia, as being the four most beautiful in antiquity. Accordingt to Strabo, it surpassed all in size and remained without a roof on account of the great width of the cell. Pausanias designates it as unfinished.

It was still standing in the 5 th century A.D. and was probably destroyed by an earthquake.

An avenue for processions comprising crouching lions and seated statues led to the Temple. The statues are now placed in the British Museum. Two fluted marble columns with a cornice block and a perfect column 6.50 ft. in lower diameter a and 68.50 ft. high are still standing, together with a part of the stylobate. Of artistic interest are the capitals discovered 18 years since with busts of the gods in the volutes and a bull's head at the middle of the connecting bolster. (1897). The frieze was ornamented by great Medusa heads with adjacent scroll work; the main cornice bore decorated dentils 1.41 ft. wide and 1.90 ft. high with a projection of 1.97 ft. The cell walls were subdivided by strongly projecting pilasters with a frieze of lyres and griffins between the pilaster capitals.

French investigators gave us further explanations relating to the details of the building.(See the beautiful publication of O. Rayet and A. Thomas:-- Milet et la Golfe Latmiaque. Paris. 1877. Then E. Pontremoli and B. Haussoullier. Didymes, Fouilles de 1895 et 1896. Paris. 1904). The entire uncovering and raising of the ruins is now undertaken by the Prussian government, which has purchased a number of the houses of the village of Jeronda covering the site of the temple and has partly removed them.

Fig. 381 gives a representation of the plan. Concerning the works in progress, see the Report of the Excavations of the Royal Museum at Miletus,from the Archaeologisches Anzeiger by Th. Wiegand. Miletus. April. 1906.

12. The Temple of Artemis Leucophryne at Magnesia on the Meander was built of white marble (and of coarse-grained bluish dense limestone as in Priene and Pergamon) by the architect Hermogenes. A pseudodipteral structure on a substructure of 5 steps, it exceeded in magnitude all temples in Asia,

according to Ctesio, accepts this. In Tombaos and Dipsen; it ever excelled them in beauty of proportions. It was contemporaneous and was nearly contemporary with the Temple at Prasus, therefore being erected about 500 to 600 B.C. As on the Parthenon, the sculpture of the cell were connected by iron cramps, the bases of the columns were of Attic form, the bases ornamented by leaves; the shafts were fluted and were composed of 5 or 4 blocks; the architrave and friezes were constructed of two pieces in width. The cove was decorated by lions' heads placed over and between the columns, and architectural ornaments were sculptured between them. The portico was covered by a coffered wooden ceiling. In the pediment was arranged no figure decoration, as for most Ionic buildings of this period.

The temple was surrounded by a wall built of great ashlars with tenons, which adjoined the walls of the city. Protanguar defensive towers were placed at certain distances; Doric colonnades of great simplicity extended along the inside of the wall.

Especially notable is the magnificent frieze representing the combat of the Amazons, of which about 660 ft. in length were found altogether, as well as other portions recently by Villetosses, Ramsen and Kern. About one-third of this is in the museum of the Louvre.

Three building periods are easily distinguished on the temple.

1. The small-at dipteral structure with Ionic columns of porus, that have 32 flutes (5 th century B.C.). 2. The pseudo-dipteral building erected by Peromenes, of the Alexandrine period in Dusti-white marble and 3. The Roman restoration, when the cell wall was surrounded by a colonnade corol friezes and the temple cover by portices and an enclosing wall. (See Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abt. Vol. 12. Heft 2. p. 224-228. Athens. 1921.).

Further information respecting the temple and other buildings in Magnesia is given by the splendidly illustrated and restoration monographs of the Royal Museum. Monsers ar Massader by Carl Humann, Julius Kohle and Carl Watzinger. Berlin.

drawings of the Guns of colonne, the floor of the bronze dow-

according to Strabo, excepting those in Ephesus and Didyma; it even excelled those in beauty of proportions. It was completed and was nearly contemporary with the Temple at Priene, therefore being erected about 330 to 300 B.C. As on the Parthenon, the ashlars of the cell were connected by iron cramps, the bases of the columns were of Attic form, the torus ornamented by leaves; the shafts were fluted and were composed of 3 or 4 blocks; the architrave and frieze were constructed of two pieces in width. The cyma was decorated by lions' heads placed over and between the columns, and anthemion ornaments were sculptured between them. The porticos were covered by a coffered wooden ceiling. In the pediment was arranged no figure decoration, as for most Ionic buildings of this period.

The temple was surrounded by a wall built of great ashlars with bosses, which adjoined the walls of the city. Rectangular defensive towers were placed at certain distances; Doric colonnades of great simplicity extended along the inside of the walls, whose surfaces were ornamented by monochrome painting.

Especially notable is the magnificent frieze representing t the combat of the Amazons, of which about 656 ft. in length were found altogether, as well as other portions recently by Villefosse, Humann and Kern. About one-third of this is in the Museum of the Louvre. [1]

Three building periods are easily distinguished on the temple.

1. The ancient dipteral structure with Ionic columns of poros, that have 32 flutes (5 th century B.C.). 2. The pseudodipteral building erected by Hermogenes, of the Alexandrine period in bluish-white marble; and 3. The Roman rebuilding, when the cell wall was surrounded by a sculptured scroll frieze and the temple court by porticos and an enclosing wall.(See Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abt. Vol. 16. Heft 2. p. 264-265. Athens. 1891.).

Further information respecting the temple and other buildings in Magnesia is given by the splendidly illustrated and beautiful publications of the Royal Museum. Magnesia am Maander by Carl Humann, Julius Kohle and Carl Watzinger. Berlin. 1904. Technically,of particular value are the Essays on the drawings of the drums of columns, the form of the bronze dow-

aonilla (Doric cone), the ground plan, the great acroterion, the statuarpts corresponding the sine antefixes of the Artemesion (c. 460-450), the altar of burnt offering etc. Also compare the original blocks in the Pergamon Museum in Berlin.

22. The Artemesion at Ephesus was the sole sanctuary of Ionia spared by Xerxes. After it was burned by Herostratos, it was rebuilt by the zealous participation of all the Greeks and according to the designs of the architect Deinocrates, by the Ionesian architects Pŏnios and Demetrios. Built in a marshy location, Roman measures ellevated the foundations of the site "by means of the skins of animals and cheeses," and made [illegible]

The beneficent and close feelins of the Ionesians furnished certain parts, columns for example, in whose flutes were inscribed the name of the giver. The temple, for which the metropolitic marble quarry of Cornesos supplied the materials, rose as a diptera structure from a substructure of 10 steps in front. The columns were about 56 ft. high, and 36 of them had on the lower portion of the shaft the sculptured figure originat previously described, in the production of which Scopas was engaged, (in spite of historical statements), while Praxiteles scorned the great alter before the temple with sculptures. The capitals exhibit a treatment allied to that of the Athenian Erechtheion.

The temple was plundered and destroyed in 262 A.D.: with the ruins, the Turks built in the 12 th century the Mosque of Selim, which is now likewise a ruin! [1]

Note 1. According to Curtius, E. Ephesos. Berlin. 1874. p. 46, 49.

In the spring of 1871, Wood succeeded in bringing to light some marble remains, such as rod 19.65 ft. deep. These prove the correctness of the fabulous dimensions of the parts of the temple given by Pausan and others, as for example, columns of 10.5 ft. diameter, or an intercolumniation of 29.52 ft.! Vitruvius also locates the invention of the Ionic style of architecture at Ephesus in the 7 th century B.C.!

In 356 B.C., the priests of the temple celebrated the existence of the temple for 1000 years. The oldest known and visited temple was begun in the 7 th century, dedicated in the 7 th

dowells (double cone), the ground plan, the great acroterias, the statements concerning the side enclosures of the Artemesion (p. 80-81), the altar of burnt offering etc. Also compare the original blocks in the Pergamon Museum in Berlin.

13. The Artemesion at Ephesus was the sole sanctuary of Ionia spared by Xerxes. After it was burned by Herostratos, it was rebuilt by the zealous participation of all the Greeks and according to the designs of the architect Deinocrates, by the Ephesian architects Pæonios and Demetrios. Built in a marshy location, Samian mechanics effected the draining of the site "by means of the skins of animals and charcoal" and made possible the erection of the structure on the prescribed place. The beneficent and pious feeling of the believers furnished certain parts, columns for example, in whose flutes were inscribed the name of the giver. The temple, for which the neighboring marble quarry of Coressos supplied the materials, rose as a dipteral structure from a substructure of 10 steps in front. The columns were about 58 ft. high, and 38 of them had on the lower portion of the shaft the sculptured figure ornament previously described, in the production of which Scopas was engaged, (in spite of historical statements), while Praxiteles adorned the great altar before the temple with sculptures. The capitals exhibit a treatment allied to that of the Athenian Propyleion.

The temple was plundered and destroyed in 262 A.D.; with the ruins, the Turks built in the 13 th century the Mosque of Selim, which is now likewise a ruin! [1]

*Note 1. According to Curtius, E. Ephesos. Berlin. 1874. p. 34, 35.*

In the spring of 1871, Wood succeeded in bringing to light some marble remains, sunk in mud 19.68 ft. deep. These prove the correctness of the fabulous dimensions of the parts of the temple given by Texier and others, as for example, columns of 10.5 ft. diameter, or an intercolumniation of 29.52 ft.! Vitruvius also locates the invention of the Ionic style of architecture at Ephesus in the 7 th century B.C.!

In 398 B.C., the priests of the temple celbrated the existence of the temple for 1000 years. The oldest known and visited temple was begun in the 7 th century, dedicated in the 7 th

cemetery by Croesus, burned by Herostratus in 356, and again rebuilt in the Hellenistic period. Only a single stone of this monumental building is in place today -- the remains of the base of a column, fragments which were formed pieces of a base of the time of Croesus. The remains of the cotaetyle lion sculpture discovered are now exhibited in the British Museum in London, where also capitals of the old and new temples, bases, pieces of cymas and acte capitals have found another.

A spirited attempt at restoration of the plan and elevation was given by the Austrian architect A. S. Hussey in the Jour. Ionian Soc. Arch. Stud. [illegible]

plan being given in Fig. 282. Further information relating to the old temple is in the great work of David Hogarth, A. I. London. 1908. British Museum Excavations, and in E. G. Hogarth's Temple at Ephesus. Greek Building. I. London. 1908. On the discovery of the new temple, see J. T. Wood's Discoveries [illegible] work of the Ais. Oest. Arch. Inst. "Forschungen in Ephesos" by Otto Benndorf. Vienna. 1906. In this, particularly the chapter on the ancient temple prepared by W. Wilberg (p. 271-324) with the plan of the old temple and details of the older capitals, cymas, bases of columns, buttress and bases of doors. Fig. 288 reproduces the plan.

14. The Temple of Cybele in Pergos, so-called by Pausanias and Strabo, referring to Herodotus.(V, 102). Destroyed by fire and earthquake, 8 marble columns were still standing in 1764, 5 at the beginning of the last century, and but 2 at this time, just covered by earth. Whatever our access behind the to the walls, entablature and columns, lie on the ground or are small concealed by it, are carried off for building purposes, according to the needs of the inhabitants and of Europeans, who build [illegible].

[illegible] the shafts of the columns show diameters varying 6.4[illegible] ft.; these indeed had a height of 55.04 ft., and thus were approximately equal to those of the Artemision in Ephesus. They were built of roughly cut drums of unequal sizes, with

century by Croesos, burned by Herostratos in 356, and again rebuilt in the Alexandrine period. Only a single stone of this wonderful building is in place. today. -- the remains of the base of a column, beneath which were found pieces of a base of the time of Croesos. The remains of the octastyle Ionic dipteral structure discovered are now exhibited in the British Museum in London, where also capitals of the old and new temples, bases, pieces of cymas and ante capitals have found shelter.

A spirited attempt at Restoration of the plan and elevation was given by the English architect A. S. Murray in the Jour. Roy. Inst. Brit. Arch'ts. Vol. 3. Series III. 1896, the ground plan being given in Fig. 382. Further information relating to the old temple is in the great work of David Hogarth. M. A. L London. 1908. British Museum Exmavations, and in W. R. Lethaby' Diana's Temple at Ephesus. Greek Building. I. London. 1908.On the discovery of the new temple, see J. T. Wood's Discoveries at Ephesus. London. 1877. Other information is in the splendid work of the Kais. Oest. Arch. Inst. "Forschungen in Ephesos" by Otto Benndorf. Vienna. 1906. In this, particularly the chapter on the ancient temple precinct by W. Wilberg (p. 221-234) with the plan of the old temple and details of the older capitals, cramps, bases of columns, gutters and leaves of doors. Fig. 388 reproduces the plan.

14. The Temple of Cybele in Sardes, so-called by Prokesch and Braun, referring to Herodotus.(V, 102). Destroyed by fire and earthquake, 6 marble columns were still standing in 1750, 3 at the beginning of the next century, and but 2 at this time, half covered by earth. Whatever cut stones belonging to the walls, entablature and columns, lie on the ground or are still concealed by it, are carried off for building purposes, accord- to the needs of the inhabitants and of Europeans, who build railways.

The temple likewise belonged with the largest of antiquity, since the shafts of its columns show diameters averaging 6.56 ft.; these indeed had a height of 58.04 ft., and thus were approximately equal to those of the Artemesion in Ephesus.. They were built of roughly cut drums of unequal sizes, with

a hole at the centre, carefully polished toward the exterior, and connected together by iron dowells set crosswise. The ivories are shaped on the spiral pieces: a rose surrounds them a light conical ornament between the volutes; scales and upright palm leaves cover the bolster. The eyes of the volutes resemble for the reception of metallic ornaments.

15. [illegible]

terra bolidrea of 8 × 12 columns on a substructure of three steps, and it was pseudoperipteros at one end. The dim-ensions of the lowest step of the stylobate are 72.12 × 100.92 ft.

The columns stood on plinths; the architrave was divided in three bands; the frieze was smooth, and the cornice had dent-ils. The style of the monument is of such purity, that it can be placed on a level with the most beautiful in antiqui-ty. Some of the columns were given by the citizens, who inser-ted their names and.the motive of the gift on a tablet fixed on the column. The rectangular temple precinct was enclosed by a wall, which was subdivided by coupled Corinthian columns, [illegible]

ported by pilaster.

16. The Temple of Zeus in Aizanoi (Aizanoi) in Phrygia, now-a-days memorised by ancient writers, was entirely unknown until 1926. An English traveler brought the first news of the exis-tence of these magnificent marble ruins, which certainly came from the end of the Asiatic monarchy or the beginning of Ro-man supremacy. Inscriptions from the 2 nd century B.C. were found there and permit the reference of a later date; but there is too much that is beautiful in the architecture, for this to be accepted with certainty. The temple was a peripte-ral structure of 8 × 15 columns on a substructure with 7 steps in front; the intercolumniation was 2.30 ft.: the distance of the columns from the wall of the cell was 7.60 ft.: the dime-nsions of the stylobate were 121.78 × 71.80 ft. The monolith-ic marble columns had diameters of 6.15 and 5.40 ft. for a he-ight of 27.97 ft.; the height of the capital was 1.21 ft. and that of the base (Ionicorne plinth) was 2.30 ft.

The volutes are rather small and are connected by a swelling band. In a peculiar way, small vases occupy the upper entires

a hole at the centre, carefully polished toward the exterior, and connected together by iron dowells set crosswise. The flutes are started on the capital blocks; a rose springs from a light scroll ornament between the volutes; scales and upright palm leaves cover the bolster. The eyes of the volutes have holes for the reception of metallic ornaments.

15. The Temple of Aphrodite in Aphrodisias was a pseudodipteral building of 8 × 15 columns on a substructure of three steps, and it was pseudotripterla at one end. Its dimensions on the lowest step of the stylobate are 72.16 × 160.72 ft.

The columns stood on plinths; the architrave was divided in three bands; the frieze was smooth, and the cornice had dentils. The style of the monument is of such purity, that it can be placed on a level with the most beautiful in antiquity. Some of the columns were given by the citizens, who inserted their names add the motive of the gift on a tablet fixed on the column. The rectangular temple precinct was enclosed by a wall, which was subdivided by coupled Corinthian columns, alternately supporting segmental and angular pediments, interrupted by niches.

16. The Temple of Zeus in Aizani (Aizanoi) in Phrygia, scarcely mentioned by ancient writers, was entirely unknown until 1825. An English traveler brought the first news of the existence of these magnificent marble ruins, which certainly date from the end of the Asiatic monarchy or the beginning of Roman supremacy. Inscriptions from the 2 nd century B.C. were found there and permit the inference of a later date; but there is too much that is beautiful in the architecture, for this to be accepted with certainty. The temple was a peripteral structure of 8 × 15 columns on a substructure with 7 steps in front; the intercolumniation was 8.30 ft.; the distance of the columns from the wall of the cell was 15.28 ft.; the dimensions on the stylobate were 121.03 × 71.83 ft. The monolithic marble columns had diameters of 3.18 and 2.86 ft. for a he height of 27.97 ft.; the height of the capital was 1.21 ft. and that of the base (including plinth) was 2.10 ft.

The volutes are rather small and are connected by a straight band. In a peculiar way, small vases occupy the upper endings

of the flutes. The centres of the columns between the arcs have cut-line members decorated by acanthus beneath the volutes; the side capitals have similar ornamentation. The walls of the cell are decorated below by fleur-de-lis, and are crowned on top by a rich frieze there. The architrave is divided into three bands, which are connected by canal beads, and it is decorated at top by a richly carved egg-and-dart moulding and vein leaves; the architrave is on the inside lower, straight, and is divided into two bands. The frieze has vertical ribbed ornament; the cornice has dentils with small modillions over them. Beneath the cell is a semicircular vaulted room 22.1 x 22.25 ft., accessible by a stairway, that may have served for preservation of the treasures of the temple.

The temple terrace is also of importance, is for the most part preserved, and it measures 400.1 x 126.21 ft. It was broken at one side by a flight of projecting steps 52.4 ft. [illegible] chas, whose former facade with marble slabs is now determined.

[illegible] the temple precinct, which was enclosed by a wall.

In the Westcourtyard (Ceasya) for Otto Berndorf (dedicated to him on his 50 th birthday by pupils, friends and colleagues) there was first given a protestantic view of the building by [illegible] 10 columns on the northern side with 2 Ionic columns on the western end and 2 Corinthian columns in the cristiodore, the northern and western walls in their entire extent, the western angle of the sanctuary, while the eastern wall is entirely destroyed. The building materials were obtained from the quarry of the village of Ortaccay, and they consist of bluish-gray semi-marble of beautiful tone. The foundations are of coarse porous limestone, the sculpture without mortar and connected by U-clamps. Determinations of age differ. Texier presses the 2 nd century B.C., Lübke and Schimmon, Semper, G. Berlsen and Bacer, the 1 st century B.C. As a peculiarity on the cell walls is to be mentioned a frieze band, that surrounds the building like an "unfolded scroll", and which is partly covered by letters. Whether the architect intended it for this re-

of the flutes. The capitals of the columns between the antes have cup-like members decorated by acanthuses beneath the volutes; the ante capitals have similar ornamentation. The walls of the cell are decorated below by frieze bands, and are crowned at top by a rich foliage frieze. The architrave is divided into three bands, which are connected by pearl beads, and it is decorated at top by a richly carved egg-and-dart moulding and palm leaves; the architrave is on the inside lower, simpler, and is divided into but two bands. The frieze has vertical piped ornaments; the cornice has dentils with small modillions over them. Beneath the cell is a semicircularly vaulted room 52.48 × 29.52 ft., accessible by a stairway, that may have served for preservation of the treasures of the temple.

The temple terrace is also of importance, is for the most part preserved, and it measured 480.19 × 534.31 ft. It was b broken at one side by a flight of projecting steps 98.4 ft. wide, on the right and left of this being decorated by 22 arches, whose former facing with marble slabs is now determined. Gardens, exedras, statues and stoas were planned and built in the temple precinct, which was enclosed by a wall.

In the Festschrift (Essays) for Otto Benndorf (dedicated to him on his 60 th birthday by pupils, friends and colleagues) there was first given a photographic view of the building by Alfred Körte. Vienna. 1898. According to this, there yet stood 10 columns on the northern side with 5 Ionic columns on the western end and 2 Corinthian columns in the opisthodome, the northern and western walls in their entire extent, the western angle of the southern, while the eastern wall is entirely destroyed. The building materials were obtained from the quarry of the village of Ortadschy, and they consist of bluish-gray semi-marble of beautiful tone. The foundations are of coarse porous limestone, the ashlars without mortar and connected by U-clamps. Determinations of age differ. Texier prefers the 2 nd century B.C., Lübke and Bühlmann, Laborde, S. Reinach and Reber, the 1 st century B.C. As a peculiarity on the cell wa walls is to be mentioned a frieze band, that surrounds the bu building like an "unfolded scroll", and which is partly covered by letters. Whether the architect intended it for this re-

remains doubtful; but it is there and extends between the first
time and a crowning band building of moderate height and proportion, above which rose the smaller columns separated by rectangular grooves according to the bed and joints up to the
ceiling cornice. The inscription consists of . Greek letter
of the Ionian Ionics varieties to erudion, concordances and mecale. The sacrd Council was in office under Hadrian (117-138)
according to the characters of the said letters. If this rumcomplition alone determines it, then is this building to be referred to the time of this emperor. My former decision neither was nor could be based on examination, hence my hesitation.
In any case, I come nearer to this Alfred Adrie, than to the
other Emperor mentioned. And I glady subscribe to his principle:-- "For the nigh-made of Asia Minor, even in the 2 nd c
century A.D., is no period of decline culture, but on the
contrary is the period, in which Hellenism most strongly unfolded itself. Ever again must it be emphasized, that the Hellenism of the Asia Minor of Roman was in general first conquered in the imperial period, when a careful government and
an assured peace afforded it conditions favorable for development."

17. The Temple of Rome and Augustus on the Acropolis of Athens. On a pedestal of 3 steps rose an Ionic monopteral building of white marble, measuring 29.3 ft. across between centres
of columns. The capitals of the columns are initiated from Ma-
ser of the Erechtheion; the architrave in three bands is bit,
the frieze is smooth and the cornice without dentils.[1]

Note 1. See concrete drawings and photographs in "Antike Denkmäler".

In the temples of the 6 th century, in the time of Pisistratus (561 B.C.), until the beginning of the 4 th century, the Doric style predominates in the Peloponnesus and in Magna Graecia; but it remained the Ionic in Asia Minor. Firmly and strongly stand the Doric structures; pillars, architrave and cornice fast hold of the strong ancient style until the time after the climax of the Greeian states. Attempts to break away from the ancient style form first occurred in the interiors of buildings. Thus for example in the temple in Phigalia, for a Doric

remains doubtful; but it is there and extends between the fret band and a crowning band moulding of moderate height and projection, above which rose the ashlar courses separated by rectangular grooves according to the bed and end joints up to the ceiling cornice. The inscription consists of . Greek letter of the Consul Avidius Quietus to archon, councillors and people. The said Consul was in office under Hadrian (125-126) according to the characters of the said letters. If this inscription alone determines it, then is this building to be referred to the time of this emperor. My former decision neither was nor could be based on examination, hence my hesitation. In any case, I come nearer to this Alfred Körte, than to the other gentlemen mentioned. And I gladly subscribe to his principle:-- "For the highlands of Asia Minor, even in the 2 nd c century A.D., is no period of declining culture, but on the contrary is the period, in which Hellenism most strongly unfolded itself. Ever again must it be emphasized, that the Hellenism of the wide plains of Phrygia was in general first conquered in the imperial period, when a careful government and an assured peace afforded it conditions favorable for development.

17. The Temple of Rome and Augustus on the Acropolis of Athens. On a stylobate of 2 steps rose an Ionic monopteral building of white marble, measuring 20.3 ft. across between centres of columns. The capitals of the columns are imitated from those of the Erechtheion,; the architrave in three bands is high, the frieze is smooth and the cornice without dentils. [1]

*Note 1. See accurate drawings and restorations in "Antike Denkmäler.*

In the temples of the 6 th century, in the time of Pisastratos (561 B.C.),until the beginning of the 4 th century, the D Doric style predominated in the Peloponnessus and in Magna Grecia; but it remained the Ionic in Asia Minor. Mighty and grand stand the Doric structures; priests, artists and people kept fast hold of the strong ancient style until the time after the climax of the Grecian states. Attempts to break away from the ancient style forms first occurred in the interiors of buildings. Thus for example in the temple in Phigaleia, for a Doric

exterior was an interior adorned by half Ionic columns, to which w was added as if in doubt a single isolated Corinthian column. It is well known that the Ionic style occurred in the interior of the Propyleion in Athens, until men finally dared to break away from the unity of style of the monuments on the Acropolis of Athens by the erection of the little Temple of the Wingless Goddess of Victory and of the Erechtheion.

The architects of the Alexandrine period placed their rejection of the Doric style before the world and declared the Ionic style of architecture to be the only happifying one.

But this must likewise experience for itself the change of things on earth, indeed in the same manner as the antiquated Doric style.

In Prigaleia the third -- the Corinthian style -- demanded a modest introduction, in the two tholoses at Delphi and Epidauros, on the Philippeion at Olympia, it already appeared definitely with its half and entire columns in the interior of the cell, until it had the leading part in its hands, just as expressively and knowingly displacing the preceding style as did its predecessor. The possibility and the advantages of its use in all cases, of greater richness in appearance assured to it an enduring existence. The need of creating a special form for the angle column it removed, and no subdivision of the frieze limited the freedom of its development. Its architectural forms required the best material, the dense and crystalline limestone.

It was again Athens, that was to receive within its walls the grandest products of the new third and last Grecian style, even if Asia Minor can exhibit a greater number of

There may be first mentioned here:--

17. The Olympeion in Athens was a decastyle (10× 21) dipteral structure containing altogether 120 columns, and it occupied a very ancient sacred place, was begun on a high artificial terrace in the lower city of Athens by the Pisastratides in 530 B.C., its foundations being completed by the architects Antistates, Callaischros, Antimachides and Porinos, then being abandoned on account of political disquiet and again taken in hand by king Antiochus IV 400 years later, who

who promised to bear their entire cost himself, and who had "the sacred cell, the double colonnade around it, the antablature and the other ornamentation, executed by a Roman citizen, [illegible] greatest skill and highest understanding; but this work has a rare, not merely in general, but even among the few greatest monuments". He counts it among the terales, "whose splendor and ingenious restoration aroused astonishment, even in the council of the gods".(See Vitruvius. VII. Introd. 15, 16, 17. A temple in the country, unfinished on account of its magnitude", according to Livy).

But even Antiochus did not see the temple completed: Hadrian alone brought it to an end in 165 A.De, after Sulla had [illegible].

The ground plan of the temple is no longer to be made out [illegible] material; the retaining wall of the terrace was interrupted [illegible] and was built of stone from Pirenes.(Pin. 36b). The shafts of the columns were approximately 5.75 ft. high, and the architrave blocks were 21.49 ft. long; 15 columns remain, partly with their architraves; 15 are still standing, one having fallen during a storm in 1852.

15. The Temple in Lebanede in Asia Minor was a hexastyle [illegible] sisted of a peristyle, pronaos, naos and opisthocome; the floor of the vestibule was one step higher than that of the peristos.

Of the temple, built of white marble, three still stand 15 columns, supporting the architrave and a portion of the frieze, while the cell and the roof are destroyed. The columns standing on the south side are not fluted, the faces of the arches are only roughed out, the mouldings on the architrave and frieze are still plain and without ornament, a token that the temple was never entirely completed.

The previously mentioned tablets on the shafts of the columns and on the convex friese are worthy of notice. The cyma is nearly destroyed, but a decoration by lions' heads is

who promised to bear their entire cost himself, and who had "the grand cell, the double colonnade around it, the entablature and the other ornamentation, executed by a Roman citizen, Cossutius, according to suitable proportions and with the greatest skill and highest understanding; but this work has a name, not merely in general, but even among the few greatest monuments". He counts it among the temples, "whose splendor and ingenious restoration aroused astonishment, even in the council of the gods".(See Vitruvius. VII. Introd. 15, 16, 17. A temple in the country, unfinished on account of its magnitude", according to Livy).

But even Antiocrus did not see the temple completed; Hadrian alone brought it to an end in 135 A.Da, after Sulla had previously taken some of its columns to Rome.(86 B.C.).

The ground plan of the temple is no longer to be made out with certainty. White pentelican marble served as the building material; the retaining wall of the terrace was interrupted by buttresses, and was about 2460 ft. in length (1/2 mile) and was built of stone from Piraeus.(Fig. 385). The shafts of the columns were approximately 55.76 ft. high, and the architrave blocks were 21.49 ft. long; 16 columns remain, partly with their architraves; 15 are still standing, one having fallen during a storm in 1852.

18. The Temple in Labranda in Asia Minor was a hexastyle structure with 11 columns on the longer sides; the plan consisted of a peristyle, pronaos, naos and opisthodome; the floor of the vestibule was one step higher than that of the portico.

Of the temple, built of white marble, there still stand 16 columns, supporting the architrave and a portion of the frieze, while the cell and the roof are destroyed. The columns standing on the south side are not fluted, the bases of the antes are only roughed out, the mouldings on the architrave and frieze are still plain and without ornament, a token that the temple was never entirely completed.

The previously mentioned tablets on the shafts of the columns and on the convex frieze are worthy of notice. The cyma is nearly destroyed, but a decoration by lions' heads is

still recognizable; the stars are covered by [illegible] so that only the uppermost one is visible, and their number cannot be determined.

12. The Corinthian reinforced structure with 6 × 6 columns on a terrace in Pergamon measuring 108.50 × 284.85 ft., rose on a stylobate about 9.84 ft. wide, which was broken by a flight of steps on the facade. Especially worthy of mention is the rich sculptured frieze with bronze heads between the volutes.

The temple -- recently made known as a temple of Trajan formerly designated as the "Augusteum" -- has entirely consisted of white marble and had a width of nearly 57.60 ft. and a length of over 109.00 ft.. The cell appears as an antae temple; the height of the columns was 32.15 ft., including the base and capital. Between the horizontal consoles of the architrave [illegible] acroteria were formed as coronides, from which grew acroteria, [illegible] exhibit the ornamentation with acanthus and sedge leaves, as on the tower of Winds in Athens.[1]

Note 1. Further thereon in the great German work, Altertümer von Pergamon. Vol. 2. Berlin. 1887.

Two separate monuments still stand in the temple court, a rectangular and a semicircular seat, the former erected by A [illegible] Rohn) gives a representation of this with the adjacent portico.

still recognizable; the steps are covered by rubbish and ruins, so that only the uppermost one is visible, and their number cannot be determined.

19. The Corinthian peripteral structure with 6 × 9 columns on a terrace in Pergamon measuring 196.80 × 224.68 ft., rose on a stylobate about 19.85 ft. high, which was broken by a flight of steps on the facade. Especially worthy of mention is the rich scluptured frieze with Medusa heads between the volutes.

The temple -- recently made known as a temple of Trajan (formerly designated as the "Augusteum"), -- Was entirely constructed of white marble and had a width of nearly 65.60 ft. and a length of over 108.00 ft.. The cell appears as an ante temple; the height of the columns was 32.15 ft., including b base and capital. Between the horizontal consoles of the main cornice were fixed bronze rosettes; the middle and side acroterias wehe formed as corollas, from which grew scrolls, above which stood winged victories. Three one-story porticos enclosed the temple court, of which the eastern and western were only raised on three steps, while the northern rested on a stylobate 13.10 ft. high. The capitals of the half columns exhibit the ornamentation with acanthus and sedge leaves, as on the Tower of Winds in Athens.[1]

*Note 1. Further thereon in the great German work, Alterthümer von Pergamon. Vol. 2. Berlin. 1885.*

Two separate monuments still stand in the temple court, a rectangular and a semicircular seat, the former erected by A Attalos II, according to an inscription. Fig. 386 (after R. Bohn) gives a representation of this with the adjacent porticos.

DIVISION IX.

Plans with one, two and three aisles, circular Temples, Temples with Adyton in the Cell, with Galleries and Stairways, Lighting of the Cell, Altars for burnt offerings, Treasuries, Temple Precincts, Telesterions and Double Temples, Magnitudes of Temples, their proportions and unit dimensions.

The plans of temples remaining to us do not all present the same arrangement. Rectangular and circular cells are contrasted, as well as later the basilican and central designs of t the Christian churches, even if not of equal importance.

The idea of the monumental canopy, as G. Semper has expressed it, is embodied in the monopteral structure of Rome and Augustus in Athens, central designs still remain to us in the Tholoses at Epidauros, Olympia, Delphi and on Samothrace; the diversity of of spacing (narrow and wide) of the columns, their arrangement in antes, their use in prostyle, amphiprostyle, peripteral structures etc. The design was previously referred to in Division IV, as well as the design of houses of deities with closed vestibules, with antes, or with prefixed portocos, as well as their triple division into vestibule, s sanctuary and most sacred place.(See Division VII and the corresponding illustrations with reference to the oldest Sicilian temples, especially in Selinus, also Fig. 387 for the comparison of the chief types of ground plans, in which evidently cannot be given all exceptions from the rule). The internal architecture of the cell must still be considered. Accordingly there are to be distinguished one, two and three-aisled cells, and those with niches at the sides (side chapels). With the first are chiefly counted the small chapel-like temples and treasuries, but also the elongated Sicilian cells, s having a width of 24.5 to 38.3 ft., as shown by the following examples:--

| | |
|---|---|
| Akragas with 24.5 ft. | Selinus with 27.8 ft. |
| Akragas with 26.2 ft. | Selinus with 29.5 ft. |
| Akragas with 31.3 ft. | Selinus with 38.3 ft. |
| Akragas with 37.7 ft. | Syracuse with 32.8 ft. |
| Paestum with 19.0 ft. | Egesta with 36.0 ft. |

These temple plans have nothing to do with the Megaron with

Examples of two-aisled cells [1] have remained to be in-
[illegible] 1. See Fig. [illegible] p. [illegible] where is [illegible]
Thermae one Zeandric.

Paestum:-- the structure with 8 columns and with a clear
distance between cell walls of 23.6 ft.;
and a distance between supports of 38.4 ft = 17.7.

Ionicus:-- Temple of Apollo with clear distance between cell
walls of 15.7 ft.;
distance between supports of 15.7 ft = 7.9 ft.

[illegible] with [illegible] between cell walls
of 38.0 ft.;
distance between supports of 2x.0/2 = 11.0 ft.

Neandric:-- Ionic colonnade in interior, clear distance be-
tween cell walls of 28.8 ft.;
distance between supports of 28.8 = 15.15 ft.

Then follows the 2-aisled cells, that with the exception of
the single-aisled, show the greatest space for the aisles.
Therefore there may be mentioned:--

1. The Olympieion near Syracuse with clear width of cell of
20.0 ft.; and middle aisle of 38.4 ft.
2. The Temple of Zeus in Olympia with clear width of cell
of 16.6 ft., and middle aisle of 21.5 ft.
3. The Artemision at Ephesus with clear width of cell of
18.2 ft., and middle aisle of 22.0 ft.
4. The so-called Temple of Poseidon at Paestum with clear
width of cell of 24.1 ft., and middle aisle of 14.1.
5. The Temple of Apollo on Delos with clear width of cell
of 20.7 ft., and middle aisle of 12.0 ft.
6. Temple 2 in Selinus with clear width of cell of 18.0 ft.
and distance between centres of columns of 22.0 ft.

We recognize that the clear spans of many single-aisled tem-
ples show almost as great dimensions as those of the middle
aisle of the colossal Temples at Syracuse and Olympia.(20.4
to 41.5 ft.). It is assumed that the latter could not be cov-
ered; for the other, men take up the previous question and
lose no words on the possibility or impossibility of a cover-
ing.

with 4 columns.

Examples of two-aisled cells [1] have remained to us in:--

*Note 1. See Fig. 388 a, b, c, d; plans in Paestum, Locri, Thermos and Neandria.*

Paestum:-- the structure with 9 columns and with a clear distance between cell walls of 35.4 ft.; and a distance between supports of 35.4/2 = 17.7.

Thermos:-- Temple of Apollo with clear distance between cell walls of 15.7 ft.; distance between supports of 15.70/2 = 7.9 ft.

Locri:-- Ionic Temple with clear distance between cell walls of 22.0 ft.; distance between supports of 22.0/2 = 11.0 ft.

Neandria:-- Ionic colonnade in interior, clear distance between cell walls of 26.3 ft.; distance between supports of 26.3 = 13.15 ft.

Then follows the 3-aisled cells, that with the exception of the single-aisled, show the greatest space for the aisles. Therefore there may be mentioned:--

1. The Didymaeon near Miletus with clear width of cell of 80.0 ft.; and middle aisle of 39.4 ft.
2. The Temple of Zeus in Akragas with clear width of cell of 73.8 ft., and middle aisle of 41.5 ft.
3. The Artemesion at Ephesus with clear width of cell of 69.2 ft., and middle aisle of 23.0 ft.
4. The so-called Temple of Poseidon at Paestum with clear width of cell of 36.1 ft., and middle aisle of 14.1.
5. The Temple of Aphaia on Egina with clear width of cell of 20.8 ft., and middle aisle of 10.0 ft.
6. Temple G in Selinus with clear width of cell of 59.0 ft. and distance between centres of columns of 23.0 ft.

We recognize that the clear spans of many single-aisled temples show almost as great dimensions as those of the middle aisle of the colossal Temples at Miletus and Akragas.(39.4 to 41.5 ft.). It is assumed that the latter could not be covered; for the other, men take up the previous question and lose no words on the possibility or impossibility of a covering.

between the two and three-aisled temples are inserted trees with cella behind niches, that occur at the Erechtheion in Athens. The Temple of Apollo in Phigaleia and the Sanctuary of Artemis at Lusoi in Arcadia (See Dest. Abb. 1908. IV. 1 Text), and if one so desires, here may be placed the three-aisled Temple of Zeus at Aizanoi and the Erechtheion near Athens, the first on account of the high screens (or partition walls) between the pairs of the middle aisle, the latter (a suggestion now of Weegen in combination with the altar-see added in proof by Fig. 298) on account of the deep wall niches between the pilasters in the interior.

It is asserted of the Heraion, that the cell was "originally" "planned for a single aisle, that four projecting walls were added later, before which were stood wooden columns, thus forming" a kind of side chapels". The wooden front columns need not be taken quite seriously, just as little as the recently appearing sublime opinion, that these were once, like all other assured columns of the building, similar to those heavily [illegible] ed by Hera for the stairways and courts in Cnossos. [1]

Note 1. One should not willfully spread such unscientific or improbable things, or make truth out of entirely doubtful hypotheses. When in a comprehensive report on the excavations in Greece during 1908, there again appear statements, that there was probably a wooden temple in Phigaleia "before Ictinos", like the ancient Heraion in Olympia" -- then might one ask, what daring showed the writer the ancient wooden Heraion in a dream!

Probing requires us to embody in wood the motives of Phigaleia. The projections of the masonry side walls as supports for the ceiling beams leaves the span of the ceiling of the middle aisle without impairing in dimensions the effect of the interior, as would occur by the middle row of supports of a two-aisled cell. The arrangement of the projecting walls is therefore an advance from the two-aisled plan of the cell, then followed by the construction with two rows of supports as a higher step of completeness. At the Temple of Athena on Aegina the cell or the aisle (naos) has a width of 15.7 m. By the introduction of free supports, the middle aisle is reduced

Between the two and three-aisled temples are inserted temples with cells having niches, that occur at the Heraion in Olympia. The Temple of Apollo in Phigaleia and the Sanctuary of Artemis at Lusoi in Arcadia (See Oest. Jahr. 1901. IV. 1 Heft), and if one so desires, here may be placed the three-aisled Temple of Zeus at Akragas and the Didymaeon near Miletus, the first on account of the high screens (or partition walls) between the piers of the middle aisle, the latter (a suggestion now of screens in combination with the atlantes added in given by Fig. 389) on account of the deep wall niches between the pilasters in the interior.

It is asserted of the Heraion, that the cell was "originally"planned for a single aisle, that four projecting walls were added later, before whose ends stood wooden columns, thus forming"a kind of side chapels". The wooden front colunms need not be taken quite seriously, just as little as the recently appearing sublime opinion, that those were once, like all other asserted columns of the building, similar to those heavy-headed ones with the larger part of the shaft at top, designed by Evans for the stairways and courts in Cnossos. [1]

*Note 1. One should not wilfully spread such uncertain or improbable things, or make truth out of entirely doubtful hypotheses. When in a comprehensive report on the excavations in Greece during 1908, there again appear statements, that there was probably a wooden temple in Phigaleia "before Iktinos", like the ancient Heraion in Olympia" -- then might one ask, what deity showed the writer the ancient wooden Heraion in a dream!*

Nothing requires us to embody in wood the motives of Phigaleia. The projections of the masonry side walls as supports for the ceiling beams lessens the span of the ceiling of the middle aisle without injuring in dimensions the effect of the interior, as would occur by the middle row of supports of a two-aisled cell. The arrangement of the projecting walls is therefore an advance from the two-aisled plan of the cell, then followed by the construction with two rows of supports as a higher step of completeness. At the Temple of Aphaia on Egina the cell or the aisle (naos) has a width of 18.7 ft. By the introduction of free supports, the middle aisle is reduced

9.88 ft., in Poiseleis to 12.60 ft. by the projecture walls, and at the Heraion in Olympia to 14.15 ft. Structural reasons alone could not have determined the introduction of projecture walls on free supports in the interior. In order to make possible the use of wooden ceilings, when men must have already mastered how to construct ceilings for spans up to 28.4 ft. In any case by their prominence, they prove for an inherent effect and an interesting subdivision of the wall surfaces, an idea of which may be given by Figs. 329, 330 a.

The direct support of the ridge of the roof (ridge purlin) by columns or piers is proved to have occurred in some early temples, but more frequently for the stoas. (Pomerance and assembly porticos).

This is fully justified in an assembly portico, both structurally and aesthetically. But in an enclosed room, which must have reference to a central point, to an image of the deity, an arrangement of middle supports is absurd, foolish and thoughtless. The arrangement of an entrance already creates a dilemma; it either requires a separate doorway corresponding to each side, or a middle doorway with the problem of accepting the supports on the pediment wall. In Greece, men resorted to the expedient of two doorways in the entrance façade, and in Egypt to the construction of two one doorway with the problem of a wall column. But both solutions are unsatisfactory.

The arrangement of an adyton, a separate cell for the image of the deity within the naos is excluded in a two-aisled temple. One such is answered by the ground plan of the Temple of Demeter in Pergamon (Fig. 326), as well as at the Temple S of Apollo in the Agora of the middle aisle, and another with the probe for the statue in the Megaron of Demeter, both near Sparta. Another is in the Temple of Hercules at Ankara, one in the Aphrodision at Aphrodisias, and one continuously overgrown in the Temple of Apollo at Delphi.

[illegible]

[illegible] by the arrangement of small columns in the interior--were these floors inserted between the first and second colonnades, thus forming galleries? The so-called Temple of Po-

9.85 ft., in Phigaleia to 13.40 ft. by the projecting walls, and at the Heraion in Olympia to 13.15 ft. Structural reasons alone could not have determined the introduction of projecting walls or free supports in the interior, in order to make possible the use of wooden ceilings, when men must have already understood how to construct ceilings for spans up to 39.4 ft. In any case by their arrangement, men strove for an internal effect and an interesting subdivision of the wall surfaces, an idea of which may be given by Figs. 389, 390 a.

The direct support of the ridge of the roof (ridge purlin) by columns or piers is prowed to have occurred in some early temples, but more frequently for the stoas.(Promenade and assembly porticos).

This is fully justified in an assembly portico, both structurally and esthetically. But in an enclosed room, which must have reference to a mental central point, to an image of the deity, an arrangement of middle supports is absurd, foolish and thoughtless. The arrangement of an entrance already creates a dilemma; it either requires a separate doorway corresponding to each side, or a middle doorway with the problem of accenting the supports on the pediment wall. In Paestum, men resorted to the expedient of two doorways in the entrance facade, and in Locri to the construction of but one doorway with the problem of a wall column. But both solutions are unsatisfactory.

The arrangement of an adyton, a separate cell for the image of the deity within the aisle is excluded in a two-aisled temple. One such is assured by the ground plan of the Temple of Demeter in Paestum (Fig. 395), as well as at the Temple G of Apollo in the width of the middle aisle, and another with the niche for the statue in the Megaron of Demeter, both near Selinus. Another is in the Temple of Hercules at Akragas, one in the Artemesion at Ephesus, and one confusedly overthrown in the Temple of Apollo at Delphi.

For the 3-aisled plan there occurs a further question, produced by the arrangement of small columns in the interior:-- were there floors insested between the first and second colonnades, thus forming galleries? The so-called Temple of Po-

Paestum is Paestum is the only one, when small stone arches connects above each other, -- but no marks of the [illegible] floor slabs from the architrave to the cell wall, while the earlier work of Selinunte (Sn. VII, pl. V) provides them. Both works are good and reliable. It is to be assumed, that Pelorusie has connected the Ionoy of his predecessor Pisanderte. Nothing on the building justifies the assumption of medallets of wood or stone. For the Temple of Zeus in Olympia are drawn thin bases from the architrave of the free adorte to the cell wall in the great Persian work on Olympia, and properly so, since near the first column of the middle aisle were found doorway lintels, that were taken to be areas for a wooden stairway. For the rich interior, the assumption of a unique ladder seems scarcely significe, such as the small bases there remits.

In their publication on the Temple on Naxos, Furtwängler and Fritscher place wooden cross beams on the abacuses of the lower internal columns and the cell wall, on these being a board floor. But this literise remains problematical, like the preceding assumption.

Why and for whom should no ascleriae there?

It [illegible] wooden ladders or by stone stairs. No indications of these still exist? Yes --! Stone stairs or arrangements for such [illegible] solar winding stairs are in Temple A near Selinunte, others and even usable still are in the Temple of Hercules, in the Temple of Zeus Lacinia and the Temple of Concordia at Akragas. But not stairways for hall galleries, as they do not lead to [illegible] stairs for artisans in making repairs. The marble buildings in Athens and many other places do not exhibit these practicals [illegible] only in southern Italy and Sicily. In the mother country men [illegible] for any internal decoration or repairs or maintenance [illegible]

Poseidon in Paestum is the only one, that still shows the colonnades above each other, -- but no marks of a floor are shown. The drawings of Labrouste in the year 1829 (plate IV) give no floor slabs from the architrave to the cell wall, while the earlier work of Delagardedde (An. VII, pl. V) provides them. Both works are good and reliable. It is to be assumed, that Labrouste has corrected the fancy of his predecessor Delagardette. Nothing on the building justifies the assumption of galleries of wood or stone. For the Temple of Zeus in Olympia are drawn thin beams from the architrave of the free supports to the cell wall in the great German work on Olympia, and properly so, since near the first column of the middle aisle were found doorway lintels, that were taken to be steps for a wooden stairway. For the rich interior, the assumption of a chicken ladder seems scarcely dignified, such as the small space there permits.

In their publication on the Temple on Egina, Furtwängler and Fietscher place wooden cross beams on the abacuses of the lower internal columns and the cell wall, on these being a board floor. But this likewise remains problematical, like the preceding assumption.

Why and for whom should be galleries there?

If they were there, they must be made accessible, either by wooden ladders or by stone stairs. Do indications of these still exist? Yes --! Stone satirs or arrangements for such can yet be found in the masonry on the Temple of Poseidon and on the hexastyle Temple in Paestum. Plans in the form of circular winding stairs are in Temple A near Selinus, others and even usable still are in the Temple of Hercules, in the Temple of Juno Lacinia and the Temple of Concordia at Akragas. But not stairways for hall galleries, as they do not lead to the interior of the cell, but rather to the attic as service stairs for artisans in making repairs. The marble buildings in Athens and many other places do not exhibit these practical designs in the ground plan. They are throroughly executed only in southern Italy and Sicily. In the mother country men were satisfied with step ladders, in order from these to care for any internal decoration or repairs or maintenance work in

the roof or structure.(Fig. 396; winding stairs in rectangular space with interesting stonecutting; Fig. 397; example of winding stairway in circular space.).

Lighting of Temple Cell. -- We see the interiors of Egyptian and Asian temples richly ornamented by colored decorations, sculptured ornament and costly furniture, without meeting with special arrangements for closely observing all these splendors by sunlight. The rooms, especially that one regarded as most sacred and most important, were withdrawn from all daylight.

Artificial lighting was better suited to the spirit of a religious faith, in which so much was based on magnificence and pageantry. The exclusion or the softening of the daylight in the interiors of religious buildings has been retained in the entire south until the present day, and it has been transferred to the modern Christian-catholic and Jewish Houses of God. No visitor can suppress a certain spell in these dimly or artifically lighted interiors, which affects his spirit; a feeling of consecration, of community, and of reflection is aroused and maintained by entering therein.

Grecian architects and priests also had a similar aim, when they suppressed the placing of windows in the cell and only admitted light through the great doorways, which, as already stated, furnished a more scanty lighting. In spite of all this, it is not sufficient for the modern or northern man; h his antique deity requires more light! Since no windows in Doric temple cells are preserved, and the primitive temple with metope windows can scarcely be deemed to have actually existed, a skylight must then light the house of the deity, like a modern museum hall, which men chiefly visit for the purpose of critical and artistic studies for their instruction, but not to produce in themselves a thoughtful frame of mind. The evidence of Vitruvius is also appealed to, who ca calmly states that no temple in Roma had a skylight, but prefers to learn from tradition that such existed at Athens. No other writer in antiquity alludes to such a peculiar arrangement; by the statements of all others, the contrary custom must be accepted. Every single passage of classical literature bearing directly on this arrangement has always had to suffer serious attacks of investigators.

Temples with such openings in the roof and ceiling are termed "hypaethral". The passage of Vitruvius relating thereto says:--(III,I,8):- "Yet the hypaethral temple is decastyle, both in the vestibule and the posticum. It is otherwise entirely similar to the dipteral temple; but it has columns above columns in the interior standing free from the walls, so that one may pass around, as in the aisles of the court with porticos; but the central portion is under the open sky and without a roof; on each side is an entrance into the vestibule and the rear apartment with folding doors. An example thereof is not found in Rome, but in the octastyle Olympeion at Athens". -- (I, II, 5). "Structures are to be built under the open sky and open overhead, dedicated to Jupiter with his lightning, to Heaven, to the Sun-god and the Moon-goddess, whose forms and acts we now behold in open and clear space."

A few passages in Plutarch, Ovid and Varro, are evidently tortured by various interpreters, or they are torn from their context in order to be used for one or another opinion. [1] Statements of Pausanias, that he saw various temples without roofs, for which condition he usually assigns a ruinous or u unfinished state, do not come up for consideration.

*Note 1. The opposed views culminate in the treatises:- Ross, L. Hellenika. Heft 1. No more Hypaethral Temple! Halle. 1846. Bötticher, E. Der Hypathral Temple proved against the Prof. Dr. Ross by the evidence of Vitruvius. Potsdam. 1847.*

*Some declare that Bötticher has incontestably established the hypaethral temple; others esteem his treatise to be merely a weak attempt to oppose Ross' views.*

Hence Vitruvius' entirely uncovered central aisle will suit the smallest number; to know that the chryselephantine statue and the treasures of the temple were exposed to the heat of the sun and the rains of winter, must then be considered. Hence but a part is taken instead of the whole, and at a proper distance from the statue of the deity, a small skylight is constructed, which can be readily closed when required. Others close the opening with brightly colored tapestry, such as the Romas used in theatres and amphitheatres. Quatremere de Quincy vaults the ceiling of the temple and furnishes it

with openings for light and ventilation ex-
[illegible]
lais hypaethral, and in his restoration of the temple at Phi-
galia he covers the middle aisle with a segmental barrel va-
ult, which is furnished with a skylight like that in the Bra-
[illegible]
best years and one made not without artistic taste, but which
does not at all correspond to the requirements of Vitruvius,
since both side aisles are lighted, and the ceiling of the m
iddle aisle is closed.

The evidence of Vitruvius, which is farther not free from
contradictions, stands on too weak feet and will then only be
accessible, if as appears to have been the case on the great
temple at Selinus or at Miletus, we regard the middle aisle
as an open court before a shrine in which was placed the pro-
tected image of the deity. Since other statements on the mat-
[illegible]
one of the numerous representations of ancient temples on
slabs of marble and on coins exhibits an opening in the roof.
[illegible]
re entirely neglected, that the interior of a house of a det-
ty with its costly treasures and sculptures was exposed to
the snow and rainfall from the open sky, as well as to owls
[illegible]
temple been found, corresponding to an opening in the roof,
for receiving the water that would enter there; no impluvium
and no drains for water are yet known, and it is probable th-
at none ever will be. Nothing authorizes the assumption that
the Parthenon at Athens, the Temple of Poseidon at Paestum,
the Temple of Aphaia on Aegina etc. were hypaethral, and there
is no evidence for this. When the Christians transformed the
Parthenon into a church, they indeed found the lighting thro-
ugh the eastern doorway sufficient; according to the evidence
of Wheler and Spon (1676), they added no new openings for
light; "they admitted the light to enter from the east, and
this is still the entire lighting."-- Other sources contrad-
ict this.[1]

with openings for light and ventilation etc. (Dormer windows). Cockerell even makes the little temples on Egina and at Phigaleia hypaethral, and in his restoration of the temple at Phigaleia he covers the middle aisle with a segmental tunnel vault, which is furnished with a skylight like that in the Bracchio Nuovo. But Chipiez presented a prettier solution in p past years and one made not without artistic taste, but which does not at all correspond to the requirements of Vitruvius, since both side aisles are lighted, and the ceiling of the m middle aisle is closed.

The evidence of Vitruvius, which is further not free from contradictions, stands on too weak feet and will then only be acceptable, if as appears to have been the case on the great Temple at Selinus or at Miletus, we regard the middle aisle as an open court before a shrine in which was placed the protected image of the deity. Since other statements on the matter are lacking, we will therefore believe, that what was customary in Rome was likewise usual in Greece. Not a single o one of the numerous representations of ancient temples on slabs of marble and on coins exhibits an opening in the roof. it is also not to be assumed that esthetic considerations were entirely neglected, that the interior of a house of a deity with its costly treasures and sculptures was "exposed to the snow and rainfall from the open sky, as well as to owls and bats. Neither has any arrangement of the pavement of any temple been found, corresponding to an opening in the roof, for removing the water that would enter there; no impluvium and no drains for water are yet known, and it is probable that none ever will be. Nothing authorizes the assmuption that the Parthenon at Athens, the Temple of Poseidon at Paestum, the Temple of Aphaia on Egina etc. were hypaethral, and there is no evidence for this. When the Christians transformed the Parthenon into a church, they indeed found the lighting through the eastern doorway sufficient; according to the evidence of Wheeler and Spon (1676), they added no new openings for light; "they permitted the light to enter from the east, and this is still the entire lighting."-- Other sources contradict this. [1]

Note 1.

*Note 1. See Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abt. Athens. Vol II. p. 42.*

The lighting may not have been as abundant as in the native churches of the famous travelers, a circumstance that we of the north, accustomed to well lighted interiors (and who desire to read in churches), also meet with in the Christian churches of Italy,(see San Miniato, Orvieto etc., where instead of plates of glass, thin and transparent slabs of marble partially fill the openings for light, as well as almost all Early Christian churches). "From the vestibule we entered the temple through a lofty doorway placed in the middle of the facade; yet neither my companion nor myself were so greatly astonished by the darkness prevailing therein, as was Mr. Guilliter, since our observations in other pagan temples had already accustomed us thereto", states the visitor mentioned. And yet in taking possession of the temple for their divine services, the Christians considered it proper to decorate the walls of the but dimly lighted interior by paintings, although but half the lofty entrance doorway was probably used for the admission of light, the other half being closed by wooden folding doors (so that only one-half as much light could enter the interior as in ancient times), also to place in the choir a canopy (heaven) supported by 4 porphyry columns, and to ornament the ceiling over the altar in the choir by a representation of the Virgin in mosaic work.

Still in the Renaissance period did men become as solicitous in regard to the light in the decoration of ecclesiastical or secular interiors as now, and which if too abundant, may easily make an interior common and valueless.

In is unnecessary in the south to admit heat and light rays of the sun into the interior of the building in mass, as in the north; precautions are taken to keep them out as much as possible, as shown in all its buildings from the earliest antiquity until the modern period. [1]

*Note 1. Choisy expresses himself in this sense(in Etudes epigraphiques sur l'Architecture Grecque, III Etude. L'Erectheium etc. Paris. 1884. p. 152); "Under the luminous sky of Athens, the doorway sufficed in case of need to light the cell".*

and archaeologists have continually proposed theoretical restorations of the lighting of Greek temples, especially of the Parthenon. Solutions succeed each other, but not even the most impeccable are free from just criticism. One good not be observed: I am convinced that the wall of the Parthenon received light only through the doorway.

The Parthenon columns were generously studied and seemed to rise into the overcast, the dimensions of the walls were exception in the dim light: the statue of Minerva, made of precious metals and ivory, alone dispersed the rays of light scattered throughout the air in the temple, not because emitting by a mysterious life luminary particles. Who knows whether, under the shining sky of Attica, the light passing through the doorway may not directly have been too bright, and whether the Greeks did not wisely it by a gentle pleasure in the upper part of the opening.

Every visitor to the Tent and to Greece knows how difficult it is to produce convincing drawings in the description in those [illegible] light contrasts, a bright dotted dress or a slight crack in the walls suffices to blunt the intensions of the [illegible]

[illegible] too bright light, all succeed objects in the temple could gain by protection from light and dust.

The very convincing example of the Acropolis (Parnassos) with 100 columns furnishes us with indisputable proof of the usefulness of windows in Greek temples. The volume of the interior of the cell of the Parthenon was nearly 8,478,000 cu. ft.; the room was lighted by an opening of 5[illegible].8 sq. ft.; that makes .007 as the ratio of the opening to the volume.

Pausanias (V, 20) says in a well known passage relating to the soldier tower rainwater the roof and the ceiling of the Sanctuary: "Alter his death there, neither the heat of summer nor the frost of winter could injure the corpse, since it was protected on all sides." This would not have been the case under the hypaethral arrangement.

Architects and archaeologists, who are still attached to the theory of the hypaethral temple, must take this into account.

Dieulafoy continues:- "For more than a century, architects a and archaeologists have continually proposed hypothetical restorations of the lighting of Greek temples, especially of the Parthenon. Solutions succeed each other, but not even the most ingenious are free from just criticism. One need not be surprised; I am convinced that the cell of the Parthenon received light only through the entrance doorway.

The farthest columns were scarcely visible and seemed to flee into the darkness; the dimensions of the hall were exaggerated in the dim light; the statue of Minerva, made of precious metals and ivory, alone attracted the rays of light scattered through the air in the temple, and became animated by a mystic life intheir reflections. Who knows whether, under the shining sky of Attica, the light passing through the doorway may not already have been too bright, and whether the Greeks did not modify it by a grille placed in the upper part of the opening.

Every visitor to the East and to Greece knows how difficult it is to produce comparative darkness in the daytime in those strongly lighted countries; a badly fitted door or a slight crack in the walls suffices to light the interiors of the largest rooms.

Moreover, without mentioning paintings, that are faded by too bright light, all exposed objects in the temple would gain by protection from light and dust.

The very conclusive example of the Apadana (Persepolis) with 100 columns furnishes us with indisputable proof of the uselessness of windows in Grecian temples. The volume of the interior of the cell of the Parthenon was nearly 2,472,092 cu. ft.; the room was lighted by an opening of 538.2 sq. ft., that gives .007 as the ratio of the opening to the volume."

Pausanias (V, 20) says in a well known passage relating to the soldier found between the roof and the ceiling of the Heraion:- "After his death there, neither the heat of summer nor the frost of winter could injure the corpse, since it was protected on all sides." This would not have been the case under the hypaethral arrangement.

Architects and archaeologists, who are still attached to the theory of the hypaethral temple, must take this into account.

The important clear dimensions of the doorways in proportion to the interior, to which they have access, besides facilitating passage, also had the further purpose of admitting light to the interior. 2

2.We still frequently light the gateway, vestibule and entrance hall through the entrance gateway or doorway.

Concerning our sanctuary [illegible] with gable roof [illegible] way light to the interior, we have the following, where is not to be forgotten, that the doorways rise nearly to the ceiling of the room.

| | | | |
|---|---|---|---|
| [illegible] | | | |
| [illegible] | | | |
| [illegible] | | | |
| Temple in Priene(middle aisle) | 1st. | 8.50. | 1/3.2 |
| Temple P in Selinus. (Hittorf). | 6th. | 8.00. | 1/4 |
| Theseion at Athens. | 5th. | 7.56. | 1/4.4 |

The outermost side doorways of the Propylaion in Athens, actually intended for ordinary passage to the Acropolis, now, have clear openings measuring about 3.6 m. ft., which is reduced to 49.5 m. ft. after the deduction of the lateral covering. ( 4.5 x 10.75 ft.). If these proportions were satisfactory at the gate of the Acropolis, they could be so likewise for entrances to interiors, that only occupied a modest portion of the area of the platform of the Acropolis, it they had to serve the same purpose. But this was no longer the case, as soon as they must fulfill the twofold purpose of affording access and of admitting light. For this reason, we also find [illegible] towards the rising sun, an abundance of light streamed into the cell, which was sufficient for seeing the images of the gods and the consecrated gifts with the desired clearness.

[illegible] temples; but if we consider the more favorable conditions of light in the south, then might likewise these irregularities always at certain hours of the day have [illegible] of lighting, in spite of the fact, that the light at the doorway was otherwise weakened by columns placed before it. For

*The important clear dimensions of the doorways in proportion* to the interior, to which they gave access, besides facilitating passage, also had the further purpose of admitting light to the interior. [2]

*2.We still frequently light the gateway, vestibule and entrance hall through the entrance gateway.or doorway.*

Comparing on certain prominent monuments this ratio of doorway light to the interior, we have the following, where is not to be forgotten, that the dorways rise nearly to the ceiling of the room.

| Buildings. | Doorway. | Middle aisle. | Ratio. |
|---|---|---|---|
| Parthenon. (middle aisle). | 665.sq.ft. | 2925 sq.ft. | 1/4 |
| Parthenon (opisthodome). | 462. | 2770. | 1/6 |
| Temple on Ægina.(middle aisle). | 126. | 449. | 1/3.5 |
| Temple in Phigaleia(middle aisle) | 161. | 620. | 1/3.2 |
| Temple R in Selinus. (Hittorf). | 365. | 3030. | 1/8 |
| Theseion at Athens. | 97. | 725. | 1/7.4 |

The outermost side doorways of the Propyleion in Athens, actually intended for ordinagy passage to the Acropolis, now h have clear openings measuring about 52.6 sq. ft., which is reduced to 48.5 sq. ft. after the deduction of the lacking coverings. ( 4.6 × 10.25 ft.). If these proportions were satisfactory at the gate of the Acropolis, they could be so likewise for entrances to interiors, that only occupied a modest portion of the area of the platform of the Acropolis, if they had to serve the same purpose. But this was no longer the case, as soon as they must fulfil the twofold purpose of affording access and of admitting light. For this reason, we also find temple doorways in the larger dimensions. Opened and being toward the rising sun, an abundance of light streamed into the cell, which was sufficient for seeing the images of the gods and the consecrated gifts with the desired clearness.

Most poorly lighted were the elongated cells of Sicilian temples; but if we consider the more favorable conditions of light in the south, then might likewise these interiors always at certain hours of the day have had a sufficient degree of lighting, in spite of the fact, that the light at the doorway was afterwards weakened by columns placed before it. For

for in cases requiring less light we can now have go to the limit of 1/20; just as much might this be permitted in the tabernacle and nearly elevated temples of the south, which no neighboring structures in narrow streets robbed of the light; yet men have not gone so far.

A lighting, such as now required for a picture gallery, was also not demanded for interiors dedicated to a deity. Men n overlooked a vapsicous lighting of the interior, whose effect might be heightened by lamplight and by the sacrificial fire, so the dazzling light of day; having once entered the sanctuary, one should feel himself secluded from the external world.

Especially men did not even need in the interior the full light, that might stream in through the doorway.

If the peristeral temple received sufficient light through the opened doors, this was so much more the case for the so-called cella temples. The bright sunlight could enter underneath and unnoticed by spectators.

For the same reason are windows in the cell walls proved in no special temple of the Doric order. On the proclamatio, poetical structure of Dynamian Zeus at Olympia windows between the columns of this peristeropteral building were rather given in the already mentioned works of Dodwell, Kinnard, Donaldson, Cockins and Stuart; the earlier statement cannot be made clear at the ruins today. (Comp. see restoration in Mauchly & Trowbridge).

Somewhat different are the conditions on the Ionic temples. We have to mention at least some of these, or which were constructed windows or entirely open front walls only intercepted by two free supports, on the Little Temple of Nike Apteros, on the cell of Athena and on that of Proschthonia, of the so-called Erechtheion on the Acropolis of Athens. As the former the cell is only 18.1 ft. wide and 17.8 ft. deep, and still it was thought necessary to cut the entrance wall and to allow the morning sun complete admission to the image of the deity. The same is true of the Erechtheion cell at the east, 22.5 ft. wide and 24.8 ft. deep, where besides the high doorway was arranged on its right and left a side window, as well as for the western cell of the building, where great windows were further constructed beside each other and between

For in rooms requiring less light we can ow here go to the limit of 1/10; just as much might this be permitted in the detached and mostly elevated temples of the south, which no neighboring structure in narrow streets robbed of its light; yet men have not gone so far.

A lighting, such as now required for a picture gallery, was also not demanded for interiors dedicated to a deity. Men p preferred a mysterious lighting of the interior, whose effect might be heightened by lamplight and by the sacrificial fire, to the dazzling light of day; having once entered the sanctuary, one should feel himself seculded from the external world.

Generally men did not even need in the interior the full light, that might stream in through the doorway.

If the peripteral temple received sufficient light through the opened doors, this was so much more the case for the so-called ante temples. The bright sunlight could enter unbroken and unhindered by colonnades.

For the same reason are windows in the cell walls proved in no special temple of the Doric order. On the problematic colossal structure of Olympian Zeus at Akragas windows between the columns of this pseudoperipteral building were indeed given in the already mentioned works of Cockerell, Kinnard, Donaldson, Jenkins and Railton; the earlier statement cannot be made clear at the ruins today.(Also see restoration in Koldewey & Puchstein).

Somewhat different are the conditions on the Ionic temples. We have to mention at least some of these, on which were constructed windows or entirely open front walls only interrupted by two free supports, on the little Temple of Nike Apteros, on the cell of Athena and on that of Erechtheus, of the so-c called Erechtheion on the Acropolis of Athens. For the former the cell is only 13.1 ft. wide and 11.5 ft. deep, and still it was thought necessary to omit the entrance wall and to allow the morning sun complete admission to the image of the deity. The same is true of the Erechtheion cell at the east, 32.8 ft. wide and 24.6 ft. deep, where besides the high doorway was arranged on its right and left a high window, as well as for the western cell of the building, where great windows were further constructed beside each other and between

the half column. The location of the building and the ratio of the doorway opening to the floor area are extremely favorable for the lighting of the main cella; they do not need the windows -- and yet they were made! Similar contradictory situations obtained between pilasters and half columns are related to parallels elsewhere, as shown by the pediment crowned sanctuary tracts of the western portion of the Agora in Messenia-s-? (German publication, p. 118), the Odeion in Tarragona and Oratoyoi's, and the so-called Pinacothek near the Propylaion at Athens.

As already stated, they were assumed by the English investigators for the pediment ends of the Temple of Zeus in Syracuse, for the assumption of great entrance doorways in. [illegible] "[illegible] ft. in width do not suffice. The space between the half columns measures 11.5 ft.), even when they are assumed to be 28.5 ft. high. For 427.20 sq. ft. of floor area is arranged about 480 sq. ft. for the admission of light, this being a ratio of 1 to 111."

The facade walls each have in the interior five pilasters and six intervals. Pockeell places in the latter narrow rectangular windows for lighting the interior, while he assumes the lower sides to be closed, indeed with reference to the arrangement established on the western side of the Propylaion. Thus it receives a double front light, which must suffice.

O Zoegebein (p. 164) likewise opposes the possibility of lighting the interior by daylight, but only by his idea of placed the giants or slaves, 24.6 ft. high. Further investigations located them in the interior, out Zoegebein places the 32 more male figures as siding to support the architrave, between the half columns and on the then wall behind them, (See Division VII), and he remarks thereon, "that on the right and left of them could be formed narrow window openings". Thereby would the same result be attained, as that desired by Pockeell. Windows are thus not replaced by Zoegebein also. On the question of lighting by skylights, he recalls a passage in Pliny, that on account of the war this greatest tem-

the half columns. The location of the building and the ratio of the doorway opening to the floor area are extremely favorable for the lighting of the said cells; they do not need the windows -- and yet they were made! Slender rectangular windows placed between pilasters and half columns are indeed no rarities elsewhere, as shown by the pediment crowned southern facade of the western portico of the Agora in Magnesia-a-M ( (German publication, p. 113), the Odeions in Termessos and C Cretopolis, and the so-called Pinacothek near the Propyleion at Athens.

As already stated, they were assumed by the English investigators for the pediment ends of the Temple of Zeus in Akragas, for the assumption of great entrance doorways fail. To even approximately light an interior 362 ft. long and 144.5 ft. wide with a height of at least 82. ft., two doorways of 7.23 ft. in width do not suffice.(The space between the half columns measures 11.8 ft.), even when they are assumed to be 29.5 ft. high. For 47700 sq. ft. of floor area is arranged about 430 sq. ft. for the admission of light, this being a ratio of 1 to 111 !

The facade walls each have in the interior five pilasters and six intervals. Cockerell places in the latter narrow rectangular windows for lighting the interior, while he assumes the longer sides to be closed, indeed with reference to the arrangement mentioned on the western side of the Erechtheion. Thus it received a doubled front light, which might suffice.

O Puchstein (p. 158) likewise opposes the possibility of lighting the interior by daylight, but only by his idea of placing the giants or slaves, 24.6 ft. high. Earlier investigators located them in the interior, but Puchstein places the 38 nude male figures as aiding to support the entablature, between the half columns and on the then wall between them, (See Division VII), and he remarks thereon, "that on the right and left of them could be formed narrow window openings". Thereby would the same result be attained, as that desired by Cockerell. Windows are thus not rejected by Puchstein also. On the question of lighting by skylights, he recalls a passage in Diodorus, that on account of the war this greatest tem-

temple in Sicily had received no roof, for which there was no

the question of the lavishly lighting of great centralized temple cells in neither exhausted nor finally answered. Only a

ed.(Frige. op. cit. 277).

But in direct connection with the temple in either sense were the great altars for the burnt offerings. Originally they were simply of rectangular form and without ornament. Frequently consisting only of an elevation of the ground or of the piled ashes of animals sacrificed, or constructed of wood and unburnt bricks, they rose later in the Hellenistic period to become great artistic structures of stone, of which the most beautiful example must have been the famous marble Altar at Pergamon. Pausanias allows the Altar of Zeus

tion to have consisted of a terrace (prothyris) 125 ft. in p

perimeter; the terrace above it had one of 88 ft.; the topmost

in the lower terrace; the thighs of the sacrificial beasts were borne to the top of the altar and there burned. To the lower terrace led stone steps on each side, with steps of ashes from thence to the top of the altar.

The example and size of the Altar in Olympia does not prove for all temples a similar assumed position before the pediment facade and the main entrance to the temple; a view of the image of the deity over the altar and through the open temple doors was likewise possible to the sacrificer with the said height of 88 ft.

On a great terrace 126 × 124 ft. rose the Altar in Pergamon above a base of moderate height and a substructure decorated

were lineaments adorned by reliefs, led to the place of sacrifi-

ritrig on three steps. These opened externally; the crossed

cross wall was turned towards the altar

temple in Sicily had received no roof, for which there was no further opportunity by reason of the destrocution of the city. Therefore the doubtful hypaethrum is also excluded here, but the question of the daylight lighting of great peripteral temple cells is neither exhausted nor finally answered. Only s side and front lighting through windows and doorways is proved.(Figs. 261, 277).

Not in direct connection with the temple in either sense were the great altars for the burnt offerings. Originally t they were chiefly of rectangular form and without ornament. Frequently consisting only of an elevation of the ground or of the piled ashes of animals sacrificed, or constructed of wood and unburnt bricks, they rose later in the Hellenistic period to become great artistic structures of stone, of which the most beautiful example must have been the famous marble Altar at Pergamon. Pausanias allows the Altar of Zeus r rising in the midst of the Altis and eastward from the Pelopeion to have consisted of a terrace (prothyris) 125 ft. in p perimeter; the terrace above it had one of 32 ft.; the total height of the altar amounted to 22 ft. Slaughtering was done on the lower terrace; the thighs of the sacrificial beasts were borne to the top of the altar and there burned. To the lower terrace led stone steps on each side, with steps of ashes from thence to the top of the altar.

The example and size of the Altar in Olympia does not prove for all temples a similar assumed position before the pediment facade and the main entrance to the temple; a view of the image of the deity over the altar and through the open temple doors was likewise possible to the sacrificer with the said height of 22 ft.

On a great terrace 145 × 124 ft. rose the Altar in Pergamon above a base of moderate height and a substructure decorated by sculptures. A great open flight of steps, whose side walls were likewise adorned by reliefs, led to the place of sacrifice. This was enclosed by Ionic porticos 10.65 ft. high and rising on three steps. These opende externally; the closed rear wall was turned toward the altar.

The completed publication of the altar lies before us in t

the magnificent great German work on Pergamon, with all the ground plans, sections, details and text, whereto were added the original plans as the greatest acquisitions of the Museum of the imperial capital, in which the finds from Magnesia-a-M and from Priene are also exhibited. They together possess everything elsewhere offered in European museums. We give from the work the ground plan and a view of the altar. (Figs. 399, 399, 400).

The treasures of the Pergamon Museum at Berlin belong amongst the most valuable that can be offered in Germany today.

(Fenlin, 1904) aids their study and in understanding them.

The great Altar of Hiero II (289-215 B.C.) in Syracuse, according to Diodorus, had the length of a stadium with a corresponding height and width. Its remains were discovered in 1880 and determined a length of 35.50 ft. for the base with strongly projecting steps and cap moulding, a width of 71.6 ft. at the north side, one of 74.0 ft. at the south side, with a remaining height of 12.7 ft.

Note 1. See Lange, P. Die Stadt Syracuse in Altertum. Auf-
[illegible]
ocoa de Syracuse. p. 42, 299. Strasburg. 1887.

Just these dimensions differ from and are somewhat inferior to those given by Diodorus. Concerning the kind of construction the curious conviction of the colossal purpose and limited finds of a few fragments of the architecture and sculpture afford us but very imperfect information. There were found fragments of a triglyph frieze, Doric cornice blocks with lions' heads, remains of a outer capital, of a great angle, as well as fragments of carvatids.

In his great work on the Temples of Sicily and Lower Italy, G. Quaseein gives definite information in text and illustrations on the altar structure (Pl. 10, p. 70), and on the basis of the finds, an interesting reconstruction, especially in the cross section through the terrace and the beam.

Of extended rectangular ground form was the Altar of Athena Polias in Priene, from the 4 th or 3 rd century B.C. The piece of it found belong to the Berlin Pergamon Museum, among

the magnificent great German work on Pergamon, with all the ground plans, sections, details and text, whereto were added the original finds as the greatest acquisitions of the Museum of the imperial capital, in which the finds from Magnesia-a-M and from Priene are also exhibited. They together surpass everything elswhere offered in European museums. We give from the work the ground plan and a view of the altar. (Figs. 398, 399, 400).

The treasures of the Pergamon Museum at Berlin belong amongst the most valuable that can be offered in Germany today. The small Guide (Fülmer) issued by the general management, (Berlin, 1904) aids their study and in understanding them.

The great Altar of Hiero II (269-215 B.C.) in Syracuse,[1] according to Diodorus, had the length of a stadium with a corresponding height and width. Its remains were discovered in 1839 and determined a length of 650 ft. for the base with strongly projecting steps and cap mouldings, a width of 71.5 ft. at the north side, one of 74.0 ft. at the south side, with a remaining height of 19.7 ft.

*Note 1. See Lupus, P. Die Stadt Syrakus im Altertum. Authorized German edition of Cavallari-Holm's Topografia archaeoogica di Siracusa. p. 42, 299. Strasburg. 1887.*

Thus these dimensions differ from and are somewhat inferior to those given by Diodorus. concerning the kind of superstructure the ruinous condition of the colossal building and limited finds of a few fragments of the architecture and sculpture afford us but very imperfect information. There were found fragments of a triglyph frieze, Doric cornice blocks with lions' heads, remains of a pier capital, of a great eagle, as well as fragments of caryatids.

In his great work on the Temples of Sicily and lower Italy, O. Puchstein gives definite information in text and illustrations on the altar structure (Pl. 10, p. 70), and on the basis of the finds, an interesting restoration, especially in t the cross section through the terrace and the hearth.

Of extended rectangular ground form was the Altar of Athena Polias in Priene, from the 4 th or 3 rd century B.C. The pieces of it found belong to the Berlin Pergamon Museum, among

[illegible] relatively slab and the relief figure. [illegible] observes of Sikon, small Ionic columns [illegible] the walls at definite intervals, between which were arranged draped figures in high relief. In the work by the Ecole [illegible] sum (c. 141) is given a likewise very excessive and also nar- monious restoration, in which the fine beauty is made unsatis- [illegible], the which most indeed have been lost on the pediment. [illegible] 401).

Other altars for burnt offerings are also determined before the successive Temple, the Erechtheion Temple, and the Dionysi- ian-Doric Temple in Pasetum, as well as at the Temple of Zeus in Akrages.

An Altar of burnt offering 78.0 ft. long and 32.0 ft. wide was also discovered in Magnesia-a-M, whose most important dis- [illegible]

The finest ornament of these forms a frieze of the figures of the gods 89.5 ft. high and almost wrought free, that covered the external surface of the encircling wall. The attempt at restoration made in the work on Priene (c. 92) gives two Ion- ic porticos at the sides and two ascending stairways, that lead to the altar for burnt offerings. (Fig. 409, second plan).

In the Alexandrine period man placed more weight on the grand design and realistic development of the altar of burnt offering than on the temple itself, for which the altar of Zeus appears most impressively, that structurally covers a greater area than the adjacent Sanctuary of Athena and the Propylaeum, and whose sculptured decoration exceeds the orion- ent in quality and quantity.

A larger Altar once stood in Pariom, that measured a stadi- um square.

Most consecrated altars could not be brought into the temple [illegible] the house of the deity. These were placed anywhere under the [illegible] arranged interesally as bases based by trees and statues, the [illegible] orias, and the altars erected to different deities.

which are to be emphasized, particularly the well preserved balustrade slab and the relief figure. Similar to the Sarcophaguses of Sidon, small Ionic columns are placed free before the walls at definite intervals, between which were arranged draped figures in high relief. In the work by the Royal Museum (p. 121) is given a likewise very expressive and also harmonious restoration, in which the fire hearth is made uncertain, but which must indeed have been found on the podium.(Fig. 401).

Other altars for burnt offerings are also determined before the enneastyle Temple, the hexastyle Temple, and the Corinthian-Doric Temple in Paestum, as well as at the Temple of Zeus in Akragas.

An Altar of burnt offering 76.0 ft. long and 52.0 ft. wide was also discovered in Magnesia-a-M, whose most important pieces are again exhibited in the Pergamon Museum in Berlin. T The finest ornament of these forms a frieze of the figures of the gods 29.5 ft. high and almost wrought free, that covered the external surface of the enclosing wall. The attempt at restoration made in the work on Priene (p. 95) gives two Ionic porticos at the sides and two ascending stairways, that lead to the altar for burnt offerings.(Fig. 402, ground plan).

In the Alexandrine period men placed more weight on the grand design and artistic development of the altar of burnt offering than on the temple itself, for which the altar of Zeus speaks most impressively, that structurally covers a greater area than the adjacent Sanctuary of Athena and the Trajaneum, and whose sculptured decoration presents the highest in quality and quantity.

A larger Altar once stood in Parion, that measured a stadium square.

What consecrated gifts could not be brought into the temple itself were exhibited in the sacred precinct, that surrounded the house of the deity. There were placed statues under the open sky or beneath graceful canopies, enclosed by stone walls, arranged internally as heroas beset by trees and statues, the little chapels built in the form of small temples, the treasuries,and the altars erected to different deities.

The treasuries served in the sacred precincts for containing [illegible] could be placed neither in the temple nor in the open air. Those discovered in Olympia had the form of small temples with a portico in front, that either opened with two columns between antes, or was treated as a practyle structure. They almost invariably exhibit the Doric style. (See the great German work on Olympia and the publications on the excavations of Delphi).

The most important of these architecturally are those of the Sicyonians, of the Kaccantines, of the Megarans, and of the Sicyons. Everywhere on the architectural parts were found the remains of colors; cobalt blue triglyphs and mutules on the Treasury of Sicyon; on that of Megara being blue-black, decorated triglyphs and mutules, red bands, blue tympanums, terra cotta cymas and tiles, while the latter were of marble on the Treasury, first mentioned.

The most interesting building of the Delphans consisted of a nave 18.0 ft long and 9.5 ft. wide, to which was later added on the southern longer side a Doric portico of 5 columns in front and 3 1/2 in depth. The columns were strongly diminished; the capitals had 4 incisions at the moulding, and the echinus had 4 annulets; the architrave was high in proportion to the triglyph friezes; the regulas and mutules lacked the drops. To it belonged the box-shaped terra cotta coverings, that were fastened to the cornice with pins. A similar design is also shown by those excavated within the sacred precinct of Delphi. Beside these then occurs the Ionic order on carvatids as free supports and tympanums adorned by figures.

Not sufficiently rich and solemn may be conceived the temple with the surrounding statues and small structures. But the impression must have been increased to the highest degree, when different temples and their accessories were crowded together on a not very large place; when entire temple precincts, as in Athens, Olympia, Delphi, Epidaurus, Arkesas, Selinus etc. were planned. In spite of their neglect and mutilation, the Athenian and the Olympian are today works of grand effect, w which we may again restore in our imagination, rebuilding anew the temple ruins, animating the sanctuary by statues and

The treasuries served in the sacred precincts for containing the sacred gifts, that on account of their kind and nature could be placed neither in the temple nor in the open air. Those discovered in Olympia had the form of small temples with a portico in front, that either opened with two columns between antes, or was treated as a prostyle structure. They almost invariably exhibit the Doric style.(See the great German work on Olympia and the publications on the excavations of Delphi).

The most important of these architecturally are those of t the Sicyonians, of the Metapontines, of the Megarans, and of the Geloans. Everywhere on the architectural parts were found the remains of colors; cobalt blue triglyphs and mutules on the Treasury of Sicyon; on that of Megara being blue-black c-colored triglyphs and mutules, red bands, blue tympanums, terra cotta cymas and tiles, while the latter were of marble on the Treasury first mentioned.

The most interesting building of the Geloans consisted of a naos 43.0 ft long and 35.5 ft. wide, to which was later added on the southern longer side a Doric portico of 6 columns in front and 2 1/2 in depth. The columns were strongly diminished; the capitals had 4 incisions at the necking, and the echinus had 4 annulets; the architrave was high in proportion to the triglyph frieze; the regulas and mutules lacked the drops. To it belonged the box-shaped terra cotta coverings, that were fastened to the cornice with pins. A similar design is also shown by those excavated within the sacred precinct of Delphi. Beside these then occurs the Ionic order on caryatids as free supports and tympanums adorned by figures.

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consecrated gifts, filling the seas with the spleen and bronzes multitude of participants in the Panathenaic festival, under the splendor of the southern sky, and against the rock-ground of a magically beautiful landscape.

In like manner may have been the effect of the temple precinct in Olympia at the time of the great festal games (Fig. 4021), when Pausanias commences the fifth book of his extensive description of Elis with the statement:-"Relics offers to the eye and the ear so many objects of wonder; but the highest interest is connected with the consecration in Elevsis and the festival in Olympia". - Even if all statues and architectural works had not equally high perfection, splendor and beauty of execution as at Athens, yet must the design, grouping and the mass of the art works exhibited in the midst of the sanctuary spreading plane trees of the Altis must have been exceedingly attractive, with the venerable olives and the surrounding temples, treasuries, baths and porticos, with the structures of the Gymnasion, the Stadion, the Theatre etc. On more than 80 altars could sacrifices be made to the gods; the number of statues of the Gods, the statues of victors, the consecrated arranged in rows were immense. Great and imposing among them may have been the statue of Zeus of the climax 22 ft. high, the dimensions 10 ells high, the beautiful Nike of Paeonios of Mendo, the group of horses with the horse-tamers, the bronze bulls, the bronze chair of Zeus on the Altis wall, the colossal bronze statues of Zeus before the terrace wall of the treasuries, and the bronze memorial column with the engraved treaty of peace. As an example of a smaller design may be mentioned the temple precinct of Epidauros.(See Kabbadias, "Ho naos tou Asklepios en Epidauroi". Athens. 1900).

Greater, more solemn and mightier still, already by its landscape surroundings at the base of Parnassos and located on a sterile and rocky mountain slope, is the effect of the temple precinct at Delphi with its monuments and accessory buildings for theatres and sports.(See View of the Leadscape; Fig. 4021). The results of the excavations of the French on this small bit of Grecian soil worthily stands beside the German in Olympia, and extend want German, Italian, English and American social of investigation has brought to light in other

consecrated gifts, filling the area with the solemn and harmonius multitude of participants in the Panathenaic festival, under the splendor of the southern sky, and against the background of a magically beautiful landscape.

In like manner may have been the effect of the temple precinct in Olympia at the time of the great festal games (Fig. 403), when Pausanias commences the fifth book of his extended description of Elis with the statement;-"Hellas offers to the eye and the ear so many objects of wonder; but the highest interest is connected with the consecration in Eleusis and the festival in Olympia". - Even if all statues and architectural works had not equally high perfection, splendor and beauty of execution as at Athens, yet must the design, grouping and the mass of the art works exhibited in the midst of the shadow spreading plane trees of the Altis must have been exceedingly attractive, with the venerable olives and the surrounding temples, treasuries, gates and porticos, with the structures of the Gymnasion, the Stadion, the Theatre etc. On more than 30 altars could sacrifices be made to the gods; the number of statues of the gods, the statues of victors, the consecrated arranged in rows were immense. Great and imposing among them may have been the statue of Zeus of the Pleans 27 ft. high, the Hercules 10 ells high, the beautiful Nike of Paeonios of Mende, the group of horses with the horse-tamers, the bronze bulls, the bronze choir of boys on the Altis wall, the dozen bronze statues of Zeus before the terrace wall of the treasuries, and the bronze memorial column with the engraved treaty of peace. As an example od a smaller design may be mentioned the temple precinct of Epidauros.(See Kabbadias, "to meron ton Asklepios en Epidauroi". Athens. 1900).

Grander, more solemn and mightier still, already by its landscape surroundings at the base of Parnassos and located on a sterile and rocky mountain slope, is the effect of the temple precinct at Delphi with its monuments and accessory buildings for theatres and sports.(See View of the landscape; Fig. 404). The results of the excawations of the Frence on this small bit of Grecian soil worthily stands beside the German in Olympia, and extend what German, Italian, English and American spirit of investigation has brought to light in other

bi, there is to be drawn upon the official French rep-
tions of Tournaive in the publication:-- "Ruines de Selinti,
exécutées aux frais du Gouvernement Français sous la Direction
de M. Théodore Homolle, Paris, Fontemoing 1892-1908, et seq.,
Plate V, but then literaise the sketches after H. Gowtow in Sc.
5. Buckendorf.(Olympia and Delphi-- Munich and Berlin. 1908).
(See ground plan and general elevation restored by Tournaire:
Plus. 406, 408). The precinct is divided into three terraces,
rising from south to north, into a lower terrace, the middle
great temple terrace, and the upper terrace, behind which is
built the theatre. Beginning at the entrance, the lower one

The sacred way begins on the east side, leads to the west
east, then passes northerly past of the eastern facade of
ple (half as long as the precinct itself) dominates the land
enclosed by protecting walls.

it bearing the genuine Mediterranean character. From it ris-
es a rock not far from the sea, that bears the noblest works
with grand technical perfection. "Eternal youth and intellect-
ual vigority" (Plutarch), distinguished and refined in spirit
rises the entrance doorway,behind it on the right the Propy-
non, on the left the Erechtheion, above it the grey and vioi-
bottom, in the distance below,the deep blue Peneiscos with
its red marble quarry. The island of Salamis is visible, the

glean, as it again suddenly becomes what it was, as if a bum-
moment we see no injuries.

places.(Priene, Magnesia-a-M, Pergamon, Miletus, Delos, Crete etc.). For the terrace-shaped developed ground plan of Delphi, there is to be drawn upon the official French representations of Tournaive in the publication:-- Feuilles de Delphi, executees aux frais du Gouvernement Francais sous la Direction de M. Theophile Homolle, Paris, Fontemoing 1892-1906, et seq., Plate V, but then likewise the sketches after H. Bomtow in Dr. H. Luckenbach.(Olympia and Delphi-- Munich and Berlin. 1904). (See ground plan and general elevation restored by Tournaie; Figs. 405, 406). The precinct is divided into three heights, rising from south to north, into a lower terrace, the middle great temple terrace, and the upper terrace, behind which is built the Theatre. Beginning at the entrance, the lower one is covered by the treasuries and the consecrated gifts.

The sacred way begins on the east side, leads to the west between the treasuries, bends at an angle of 45° toward the east, then passes northerly part of the eastern facade of the Temple of Apollo, next bending at a right angle to the west toward the theatre. The longitudinal extent of the Temple (half as long as the precinct itself) dominates the land enclosed by protecting walls.

An entirely different view is given to us by the temple precinct on the Acropolis at Athens. The landscape is changed, it bearing the genuine Mediterranean character. From it rises a rock not far from the sea, that bears the noblest works of all time in architecture, executed in the finest material, with grand technical perfection. "Eternal youth and intellectual vivacity" (Plutarch), distinguished and refined in spirit rises the entrance gateway,behind it on the right the Parthenon, on the left the Erechtheion, above it the gray and violet Hymettos, at the east the monotonous and brownish-red Lycabettos, in the distance being the deep blue Pentelicos with its red marble quarry. The island of Salamis is bluish, the Peloponnessian coasts in a light haze, Acrocorinth in a red mist, and the lofty mountains of Megara appearing in pure gold. In this light must one come opposite the Parthenon and see it gleam, as it again suddenly becomes what it was, as if a burning shame seized upon it in its present condition. At such a moment we see no injuries, Such evenings elevate the Athenian

Hundreds above constructions, Rome and Italian. (See her description but merely indicated here in the work of Dutton known to Americans she found in Japan [illegible]. Pl. 2 ud edition. c. 1[illegible]-[illegible]. Wiesbaden. 1[illegible] [illegible], well on t the Acropolis, the plan after the scientific position of Kab- [illegible] and [illegible] [illegible], [illegible] [illegible].

And yet observes is the effect of the view of the temple precinct of Poseidon with its different terraces and steps, its theatre, the library and the adjoining platform of the pre- at Ulmer of Ulm, above action is the Pergamon with the [illegible] and great terraces. (See ground plan in Fig. 4[illegible], after the great Pergamon work of the Royal Prussian Government).

How greatly is our knowledge of the nations world and its art enriched by these excavations, the collection, exhibition and comparison of these treasures? Has their utilization made [illegible] [illegible]? - I believe not!

[illegible] some special cases.

For the special form of the circular temple mentioned by Vi- truvius, the tholos, that only consisted of an open colon- nade with an entablature and roof above it, the little circu- lar temples of the Greeks or Romans Etruscan in Olympia gives an idea and an easier basis of it, and the "wells of Rome and Augustus on the Acropolis of Athens. The Observatory Monument of Lysicrates in Athens might be treated accordingly.

But in certain cases the temple also had the purpose of ser- ving two gods as a place of worship; then a separate room for each became necessary. The cell was accordingly divided; th- [illegible] [illegible] [illegible].

Then the cell might either be divided according to Egyptian prototypes by a longitudinal wall, in front by a cross wall, or by an entablature the height could be limited into cir- cles. The latter was the case in the Temple of Aphrodite Ar- ned in Greece mentioned by Pausanias: "the temple had an up- per story, which was dedicated to Koronos". Of a division lead- ing's no examples remain. A division in depth is expressed by the Temple in Eleusis dedicated to Ares and Aphrodite: the entrance to the cell of Ares was on the eastern frontes,

landscape above Constantinople, Rome and Naples.(See the description but merely indicated here in the work of Julius Braun in Geschichte der Kunst in ihrem Entwickelungsgang. II. 2 nd edition. p. 546-580. Wiesbaden. 1873.) Athens, walk on t the Acropolis, the plan after the splendid publication of Kabbadias and Kawerau. Athens. 1908. Also Fig. 407.).

And yet otherwise is the effect of the view of the temple precinct of Pergamon with its different terraces and stoas, its Market, the Library and the adjoining plateau of the great Altar of Zeus, above which is the Theatre with the adjacent great terraces.(See ground plan in Fig. 408, after the great Pergamon work of the Royal Prussian government).

How greatly is our knowledge of the antique world and its art enriched by these excavations, the collection, exhibition and comparison of these treasures? Has their utilization made equal progress therewith? -- I believe not!

Besides the normal forms of temple are yet to be mentioned some special ones.

For the special form of the circular temple mentioned by Vitruvius, the monopteral, that only consisted of an open colonnade with an entablature and roof above it, the little circular temples of the Exedra of Herodes Atticus in Olympia gives an idea and an assured basis of it, and the Temple of Rome and Augustus on the Acropolis of Athens. The Choragic Monument of Lysicrates in Athens might be termed pseudomonopteral.

But in certain cases the temple also had the purpose of serving two gods as a place of worship; then a separate room for each became necessary. The cell was accordingly divided; thus originated the double temple, the naos diplous.

Then the cell might either be divided according to Egyptian prototypes by a longitudinal wall, in depth by a cross wall, or by an entablature the height could be diwided into two stories. The latter was the case in the Temple of Aphrodite Armed in Sparta mentioned by Pausanias; "the Temple had an upper story, which was dedicated to Morpho". Of a division lengthwise no examples remain. A division in depth is expressed by the Temple in Mantinea dedicated to Ares and Aphrodite; the entrance to the cell of Ares was on the eastern facade,

on the western being that to the cell of Aphrodite. Similar was the division in Abydos; evidently that a single doorway there led to both cells; in the front room was the statue of Hyacos, in the interior being that of Apollo.

The most beautiful but also the most complex example of a temple, that was at the same time dedicated to several deities, is the Eleusinion established on the Acropolis of Athens.

It has already been indicated, that the temple was not intended to receive great numbers of men and so hold therein such corresponding ceremonies -- they were the seats and dwellings of the deities; the great and solemn ceremonies were performed outside them.

In exception is here made only by the buildings intended for the celebration of the mysteries, the consecrating temples, [illegible] found themselves together in a common religious work.

The consecrated (initiated) assembled in the sanctuary of the deity for a mystical or religious worship; the temple became a hall.

We have more definite knowledge of that in Eleusis; it dated from the time of Pericles; the cell formed a square room with sides 67 ft. long, that was divided into eight aisles by seven rows of columns; a stepped construction extended around the walls in the outer aisles and was interrupted in six places by entrances. [1] Before one side of the cell was externally placed a portico of 12 columns.

[illegible]

According to Puchstein (p. 158) the temple of Zeus at Olympia can be indicated here with the vast hall, that could offer in its three aisles space for the greatest festival assembly.(See tabular comparison of the kinds of temples). An allied design is shown by the Ptolemaisteion in Thebes and [illegible]

[illegible] mainly stated, that the greater number of the bases of deities did not exceed a certain average size of about 70 to 80 ft. on the frame, so that on very many monuments the necessary

on the western being that to the cell of Aphrodite. Similar was the division in Sicyon; excepting that a single doorway there led to both cells; in the front room was the statue of Hypnos, in the interior being that of Apollo.

The most beautiful but also the most complex example of a temple, that was at the same time dedicated to several deities, is the Erechtheion standing on the Acropolis of Athens.

It has already been indicated, that the temple was not intended to receive great numbers of men and to hold therein such corresponding ceremonies -- they were the seats and dwellings of the deities; the great and solemn ceremonies were p performed outside them.

An exception is here made only by the buildings intended for the celbration of the mysteries, the consecrating temples, (telesterions or megaras), in which great multitudes of men found themselves together in a common religious work.

The consecrated (initiated) assembled in the sanctuary of the deity for a mystical or orgiastical worship; the temple became a hall.

We have more definite knowledge of that in Eleusis; it dated from the time of Pericles; the cell formed a square room with sides 177 ft. long, that was divided into eight aisles by seven rows of columns; a stepped construction extended around the walls in the outer aisles and was interrupted in six places by entrances. [1] Before one side of the cell was externally placed a portico of 12 columns.

*Note 1. See the ground plan in Praktika. Athens. 1898. Also plate 1 in Dörpfeld's Bericht. Fig. 134.*

According to Puchstein (p. 193) the Temple of Zeus at Akragas should be included here with its vast hall, that would offer in its three aisles space for the greatest festival assembly.(See tabular comparison of the kinds of temples). An allied design is shown by the Ecclesiasterion in Priene and the Thersilion in Megalopolis, to which we shall return.

Concerning the magnitudes of temples, it may finally be briefly stated, that the greater number of the houses of deities did not exceed a certain average size of about 79 to 97 ft. on the facade, so that on very many monuments the necessary

Temples in Doric order at Aegina.

Proportions between length of cella and its width are also reduced so that for example, the Temple of Zeus in Agrigentum, so that for example, the Temple of Ceres is enlarged in dimensions about four times in the Temple of Zeus in Agrigentum.

Here occurs a considerable difference in the dimensions of the columns, of the original Pronaos, of the pronaos and, and yet the same forms are always retained, which thus experience a change to the colossal, sometimes a reduction to the microscopical. The narrow annulets on the echinus, the reduction of the triglyphs, the vias, and the corniche on the small Temple on Delos are entirely similar in form to those of the giant Temple of Agrigentum.

Besides the linear comparison in Fig. 405 of some outlines in magnitudes, I think it proper to make a comparison of some well known buildings nearer us with the colossal structures of the three Greek orders.

a. Doric order, the Temple of Jupiter Olympian in Athens, in Greek with the Erechtheum Minster, whose ridge corresponds with the pediment acroteria of the Temple, and whose three stales, including the arrangement of buttresses, finials, flying buttresses etc., find room in the principal portico of the Temple at Athens, still leaving free a considerable space.

b. [illegible] one of the three greatest temples of Greek antiquity with [illegible].

c. For the Ionic order, the Diyamion near Miletus in Fig. 411.

d. For the Corinthian order, the Temple of Zeus in Athens, Fig. 412.

For what we understand by good proportions of a building, the Greeks had the term "symmetrica". From this have we derived the [illegible] "Symmetry", but [illegible] modern ideas, but it does not therefore require good proportions.

[illegible]

details do not differ much in size.

The given average length of the facade is also reduced to one half and increased to more than twice, so that for example, the Temple on Egina is enlarged in dimensions about four times in the Temple of Zeus in Akragas.

Here occurs a considerable difference in the dimensions of the capitals, of the triglyph frieze, of the cornice etc., a and yet the same forms are always retained, which thus experience a change to the colossal, sometimes a reduction to the graceful. The narrow annulets on the echinus, the regula and drops, the divisions of the triglyphs, the vias, and the cornice on the small Temple on Egina are entirely similar in form to those of the giant Temple of Akragas.

Besides the linear comparison in Fig. 409 of some outlines of Doric temples, which permit the recognition of the increase in magnitudes, I think it proper to make a comparison of some well known buildings nearer us with the colossal structures of the three Grecian orders.

a. For the Doric order, the Temple of Apollo (G in Puchstein) in Selinus with the Freiburg Minster, whose ridge coincides with the pediment acroteria of the Temple, and whose three aisles, including the arrangement of buttresses, finials, flying buttresses etc., find room in the principal portico of the Temple at Selinus, still leaving free a considerable space.[1]

*Note 1. Diagrams for judging of the proportionate dimensions of the three greatest temples of Grecian antiquity with those of mediaeval cathedrals. (Figs. 410-412).*

b. For the Ionic order, the Didymaion near Miletus in Fig. 411.

c. For the Corinthian order, the Temple of Zeus in Athens, Fig. 412.

For what we understand by good proportions of a building, the Greeks had the term "symmetrica". From this have we derived the word "symmetry", but which expresses something entirely different; for a building may be symmetrical according to modern ideas, but it does not therefore require good proportions.

The foundation of the theory or principles of good proportions in Grecian architecture has already greatly busied our

learned man and prosbitiseas.

Note 1. In this connection should be mentioned:--

Viollet-le-Duc. Dict. Rais. de l'Arch. Vol. 7. p. 328-338. [illegible] Paris. 1861.

[illegible] Vol. [illegible]

Paris. 1868. --"It would cause deception to believe that proportions in architecture are the result of instinct. There are [illegible]."

Aurea. Nouvelle Theorie destiné le [illegible] de Vitruve. [illegible]

Hardouin, E. Théorie des proportions appliquées aux l' architecture depuis la XII dynastie des rois égyptiens jusque XVI siècle. Paris. (Reviewed by A. Diesing in Allg. Bauz. 1889. Litteraturblatt. p. 89-92.

[illegible]

Tamon, R. Le théatre de Polycleto, reconstitué d'après un [illegible]. Paris. 1890.

According to ancient procedure, it would be required that the design for a structure should once be made and laid out in all its details according to fixed mathematical ratios, which work must then be followed by corrections demanded by the best [illegible] e., after its completion, by the laws of optics, by the immediate surroundings etc., for design and execution are not always concealed in the effect. The originally fairly fixed dimensions of the building thereby suffer small changes, for some parts must be made smaller and others larger. Plato says with this meaning:-- "Here an artist to conceive the beauty of a monument to depend on the exact copying out of symmetry, he would only have to consider that the higher parts thereof seem smaller and the lower parts larger, then are united to produce perfect harmony. The true artist therefore neglects the measurements of rigid rules, based on the exaction of exact symmetry, and he adapts in the image of his work proportions and irregularities, which satisfy the requirements of beauty in appearance, even if the requirements of truth must therefore be neglected".

learned men and practitioners.[1]

*Note 1. In this connection should be mentioned:--*

*Viollet-le-Duc. Dict. Rais. de l'Arch. Vol. 7. p. 532-536. Art. Proportion. Paris. 1864.*

*Viollet-le-Duc. Entret. sur l'Arch. Vol. 1. p. 395-406. Paris. 1863. --"It would cause deception to pelieve that proportions in architecture are the result of instinct. There are absolute rules and geometrical principles."*

*Aures. Nouvelle Theorie deduite du texte meme de Vitruve. Nimes. 1862.*

*Henzlmann, E. Theorie des proportions appliquees dans l' architecture depuis la XII dynastie des rois Egyptiens jusqua XVI siicle. Paris. (Reviewed by A. Ziesing in Allg. Bauz. 1863. Litteraturblatt. p. 31-38.*

*Pennethorne, J. and E. Robinson. Geometry and Optics of Ancient Architecture. London and Edinburgh. 1878.*

*Dumon, K. Le theatre de Polyclete, reconstitue d'apres un module. Paris. 1890.*

According to ancient procedure, it would be required that the design for a structure should once be made and laid out in all its details according to fixed numerical ratios, which work must then be followed by corrections demanded by the best point of view for the observer of the building in reality, i. e., after its completion, by the laws of optics, by the immediate surroundings etc., for design and execution are not always concealed in the effect. The originally firmly fixed dimensions of the building thereby suffer small changes, for some parts must be made smaller and others larger. Plato says with this meaning:-- "Were an artist to conceive the beauty of a monument to depend on the exact carrying out of symmetry, he would only have to consider that the higher parts thereof seem smaller and the lower parts larger, than are required to produce perfect harmony. The true artist therefore neglects the requirement of rigid truth, based on the execution of exact symmetry, and he adapts in the image of his work proportions and irregularities, which satisfy the requirements of beauty in appearance, even if the requirements of truth must thereby be neglected".

If the procedure in antiquity was in accordance with the [illegible]

[illegible] cations buildings have before us the original symmetrical design, but was corrected once, or to exaggerate, the curvature of the former. In order to find the key to the symmetrical numerical ratios, we must then correct the drawings with reference to the local and other conditions, which at the time determined the correction of the symmetrical design, but which in most cases must have its own [illegible] Most of the attempts to discover the key by the methods of triangles or squares, or by the module, (when sometimes the lower and sometimes the middle diameter of the column is taken as the unit), indeed for the given reasons lead to no uniform result. The most recent attempt of Dumon ("Theorie de Polycleas") to discover the module of Polycleitos likewise does not overcome these difficulties, and is finally consoles himself with the principle, "not for the purpose of beauty or even of utility, artists departed from the accurate proportions in the execution", and Cuipies (Revue Arch. Ser. 5. Vol. 7. p. 98-99. 1917) adds in his review of Dumon's work, that "[illegible] also architectural creations owe their grace and beauty. As soon as the required corrections are omitted, one has to do with a work, whose esthetic worth is no greater than that of [illegible]

Professor Robert Reinhardt at the Polytechnicum in Stuttgart published with surprising results his thirsted investigations on the "Gesetzmass to law of Greekian architecture", illustrated on monuments of different architectural periods. (Gesetzmässigkeit der Tempelarchitektur [illegible]).

Likewise Dr. Theodore Alt gives us in his book, "Die Grundzüge der Kunst und der Baukörperlichkeit der Antike", Berlin, 1886, very interesting observations and conclusions on the obedience to law of art and the authority of antiquity. "Unity of the work is the second principal requirement and a supreme law of [illegible] art [illegible]" (p. 100).

We may therefore repeat and assert, that the two principles, [illegible] the

If the procedure in antiquity was in accordance with the statements of Plato, we do not in our geometrical drawings of antique buildings have before us the original symmetrical designs, but the corrected ones, or to exaggerate, the caricatures of the former. In order to find the key to the symmetrical numerical ratios, we must then correct the drawings with reference to the local and other conditions, which at the time determined the correction of the symmetrical design, but which in most cases must have its own difficulties! Most of the attempts to discover the key by the methods of triangles or squares, or by the module, (when sometimes the lower and sometimes the middle diameter of the column is taken as the unit), indeed for the given reasons lead to no uniform result. The most recent attempt of Dumon (Theatre de Polyclete) to discover the module of Polycleitos likewise does not overcome these difficulties, and he finally consoles himself with the principle, "that for the purpose of beauty or even of utility, artists departed from the accurate drawing in the execution", and Ghipiez (Revue Arch. Ser. 3. Vol. 7. p. 98-99. 1881) adds in his review of Dumon's work, that [1] just to variations from the rule do the greater part of Grecian architectural creations owe their grace and beauty. As soon as the required corrections are omitted, one has to do with a work, whose esthetic worth is no higher than that of a building, constructed by an engineer according to a "formula".

*Note 1. Very recently has Upper Building Councillor and P Professor Robert Reinhardt at the Polytechnicum in Stuttgart published with surprising results his talented investigations on the "Obedience to law of Grecian architecture", illustrated on monuments of different architectural periods. (Gesetzmassigkeid der Griechischen Baukunst). (Stuttgart. 1903).*

*Likewise Dr. Theodore Alt gives us in his book, "Die Grenzen der Kunst und der Buntfarbigkeit der Antike", Berlin, 1886, very interesting observations and conclusions on the obedience to law of art and the authority of antiquity. "Unity of the work is the second principal requirement and a supreme law f for all art works".(p. 109).*

We may therefore repeat and assert, that the two principles, according to which Grecian architects labored, were first the

Just as the derivation of the rules for proportions from the executed buildings may lead to doubtful results, it is equally dangerous to desire to accurately deduce from the constructed structures the unit of measure employed as a basis for them. On the one hand, we do not know how far the executed buildings deviate from the designs; on the other, the dimensions of the parts of the building that should be alike according to the design are frequently unlike in execution, and which part may then have the true dimensions, for example, which of the unequally wide columns of the Parthenon square with the dimensions of the design? On the great Altar of Hiero II in Syracuse, the stylobate is 71.5 ft. wide on the north side, while the [illegible] Altar is 74.1 ft. [illegible] ten on the plan, shall the unit of measure be deduced?

Who would succeed today in accurately determining the lengths in whole numbers on the plans were plans available for reference? Already the fact, that the scales employed in the construction of the buildings are not all equal, that some are and not yet [illegible], that they [illegible] [illegible] vary differently (in regard to differences of temperature), [illegible] difference in [illegible] and [illegible] Centuries might be pardoned, but not mathematical accuracy!

[illegible], [illegible] [illegible] me 38 years since:-- "It would indeed be very difficult to determine the length of a meter from modern buildings".

preparation of the design with harmonious proportions, and next the correction of this on the basis of the peculiar conditions.

Just as the derivation of the rules for proportions from t the executed buildings may lead to doubtful results, it is equally dangerous to desire to accurately deduce from the completed structures the unit of measure employed as a basis for them. On the one hand, we do not know how far the executed dimensions (widths, lengths and heights) accurately corresponded to the dimensions written on the designs; on the other, the dimensions of the parts of the building that should be alike according to the design are frequently unlike in execution, and which part may then have the true dimensions, for example, which of the unequally high columns of the Parthenon agrees with the dimensions of the design? On the great Altar of Hiero II in Syracuse, the stylobate is 71.5 ft. wide on the north side, while the corresponding dimension on the south side is 74.1 ft., thus showing a difference of 2.6 ft.; from which one of the two numbers, which were certainly written on the plan, shall the unit of measure be deduced?

Who would succeed today in accurately determining the length of our meter (or foot) from our buildings, if large dimensions in whole numbers on the plans were alone available for reference! Already the fact, that the scales employed in the construction of the building are not all equal, that some are new and others are worn out, that they were of materials acting very differently (in regard to differences of temperature), from which result the differences in laying out dimensions etc. Inequalities might be pardoned, but not mathematical accuracy!

In Furtwängler's publication of the Temple on Egina (Munich. 1906. p. 52), he assents to the principle already stated by me 16 years since:-- "It would indeed be very difficult to determine the length of a meter from modern buildings".

## [illegible] R. [illegible] & [illegible].

"The Drama, far from being concerned of a peculiar [illegible] cate, for more itself even served for the [illegible] of the [illegible], and in every larger Greek city, a theatre was just as [illegible] to be found as a temple".

Dithyrambs and divinely inspired songs were sung therein. Poets here declaimed their verses before the people. It was [illegible] for any citizen of the state to support the theatre [illegible] as honored office by birth, or later of the [illegible] [illegible]ity, was to undertake the supervision or arrangement of the [illegible]. The state provided for the actors, who were placed [illegible] the [illegible]; it likewise made attendance possible for the [illegible] without means. Plays were not given for profit, but for [illegible] until the period of decadence, till the wit and bitter criticism of Aristophanes appeared, the theatres were in truth temples of art, accessible to the entire people, the centre and focus of political, religious and artistic life. They deteriorated as the people were overcome by the orient, or only found employment in wrestling contests, equine races, or in the riotous games of the stews, and these become the sole and the last and [illegible], until Christianity likewise [illegible] them, [illegible] [illegible].

Arrangement and Construction. -- The beginnings of the Greek theatre are rooted in the mounds of Dionysos. The dithyrambs, the lyrical poem, that glorified the great deeds and the sorrows of the god, contained the germs of tragic poetry, while traces of comedy are to be sought in the improvisations [illegible] of the festal triples and in the phallic [illegible].

His [illegible] were sung by the line of dancers around the altar of the god; thus be formed the centre of the festal [illegible] and the centre of the festal place.

The space around it, on which the choruses moved, became the orchestra, the place for the dancing. Adjoining this was the space for spectators, the theatre proper.

So long as merely an elaboration of the chorus and its lyric expressed the dramatic play, these two divisions sufficed; a third one became necessary when the tragedie actors appeared. Thespis introduced before 500 B.C. an actor not belonging [illegible]

DIVISION X. THEATRES AND ODEIONS.

"The Drama, far from being condemned by a jealous priestly caste, far more itself even served for the worship of the gods, and in every larger Greek city, a theatre was just as certain to be found as a temple".

Dithyrambs and divinely inspired songs were sung therein, Poets here declaimed their verses before the people. It was honorable for any citizen of the state to support the theatre and an honored office by birth, or later of the monied nobility, was to undertake the supervision or arrangement of the chorus. The state provided for the actors, who were placed under the poets; it likewise made attendance possible for those without means. Plays were not given for profit, but for worship; until the period of decadence, till the wit and bitter criticism of Aristophanes appeared, the theatres were in truth temples of art, accessible to the entire people, the centre and focus of political, religious and artistic life. They deteriorated as the people were overcome by the orient, or only found enjoyment in wrestling contests, chariot races, or in the murderous games of the arena, and these became the sole and the last art enjoyments, until Christianity likewise terminated them, after obtaining control.

Arrangement and Construction. -- The beginnings of the Greek theatre are rooted in the worship of Dionysos. The dithyramb, the festal poem, that glorified the great deeds and the sorrows of the god, contained the germs of tragic poetry, while those of comedy are to be sought in the unrestrained songs of the festal jubilee and in the phallic hymns.

His deedes were sung by the line of dancers around the altar of the god; thus he formed the centre of the festal celebration and the centre of the festal place.

The space around it, on which the chorus moved, became the orchestra, the place for the dancing. Adjoining this was the space for spectators, the theatre proper.

So long as merely an alternation of the chorus and its leader expressed the dramatic play, these two divisions sufficed; a third one became necessary when the separate actors appeared.

Thespis introduced before 500 B.C. an actor not belonging to the chorus. The speaking then alternated between him and

the favour of the chorus, which then struck in less frequently with the songs. While the chorus then reached its peak, a special place for the actors, the stage, was arranged behind the circular space for dancing and acting.

Therefore a theatre had to satisfy the requirements of a level place for the chorus (orchestra, consists), a place for the actors (skene), and seats for the greatest possible number of spectators (theatron), parts that were to be arranged around the altar of Dionysos (thymele) as the centre of the occurrences.

The chorus was originally accompanied only by a simple flute player, in which accompaniment the flute was subordinated to the voice; the dance steps took the form of dance figures (schemata) by turns and twists, "in which the meaning of the song was made more or less visible to the eye".

Plays did not occur every day, but only on certain festivals, and then from the early morning hours the open sky only a less period demarked the covered theatre.

Pantomimes were renounced in the wide and great interiors; but on the other hand, the actors sought to appear larger or darker subtly were by the use of artificial means, such as the wearing of masks with high tubes (cothurnus), of face masks with a kind of tuppee, by the padding of breast and body, and by enlarging the hands by means of gloves.

Representations at the festal plays were originally extremely simple. The body was covered by a light apron, the face adorned with dyes, the head with ivy and the cheeks covered with leaves- this was the earliest costume; later c came into use other means of colouring and masks of linen cloth and wool.

The backround for the drama was not formed by God's free nature; Poster already reported, "that it would be a great error to believe, that in a theatre anywhere the violently moved as a background". The substitute scene in a solid circle around the place for dancing (orchestra); in the time of Sophocles was the circle crowed and the stage with its proscenium formed the background for the figures. Three walls and coulisses (periaktes, rotaters) became perforated with sceno-

the leader of the chorus, which then struck in less frequently with its songs. While the chorus then retained its place, a special place for the actors, the stage, was arranged behind the circular space for dancing and acting.

Therefore a theatre had to satisfy the requirements of a level place for the chorus (orchestra, conistra), a place for the actors (skene), and seats for the greatest possible number of spectators (theatron), parts that were to be arranged around the altar of Dionysos (dumeln) as the centre of the occurrences.

The chorus was originally accompanied only by a single flute player, in which accompanient the flute was subordinated to the hymn; the dance steps took the form of dance figures (skemata) by turns and twists, "in which the meaning of the hymn was made more or less visible to the eye".

Plays did not occur every day, but only on certain festivals, and then from the early morning beneath the open sky; only a late period demanded the covered theatre.

Pantomimes were renounced in the wide and great interiors; but on the other hand, the actors sought to appear larger than they actually were by the use of artificial means, such as the wearing of shoes with high soles (cothurnus), of face masks with a kind of toupee, by the padding of breast and body, and by enlarging the hands by means of gloves.

Representations at the festal plays were originally extremely simple. The body was covered by a light apron, the face stained with dregs, the head wound with ivy and the cheeks c covered with leaves -- this was the earliest costume; later c came into use other means of coloring and masks of linen cloth and wood.

The background for the dramas was not formed by God's free nature; Texier already remarked, "that it would be a great e error to believe, that in a theatre anywhere the vicinity served as a background". The multitude stood in a solid circle around the place for dancing (orchestra); in the time of Eschylus was the circle opened and the stage with its proscenium formed the background for the players. Stage walls and coulisses (periactes, rotaters) became perfected with Sopho-

sanctuaries, according to the auspices of Apollonia in Tyrrhenia (-60), as well as according to the notion of Aristotle (Poetics). And on Greek theatres of the early and late Roman Period (Laws to Vespasian Emperors), stone mechanical and splendid architecture crowded through two storeys and enclosed the stage.

Of the mechanical arrangements of the theatre we know, that roller machines (ekkyklema) were in use, "on which was shown the interior, after the room had been opened"; Hydraulic modeling and flying machines (aiorrhia) on which gods and men appeared flying in the air (Eudoxius, Prometheus etc.); also arrangements for thunder and lightning, traps for sinking trees through the wooden floors, stairways to the lower rooms, or which ghosts and apparitions ascended and descended.

The parts of the Greek theatre building were but loosely connected together and were not combined in an architectural work. The audience room and the stage were only connected by stairways and do not appear as an organically connected architecture by its peculiar location on the mountain slope. Power not first created in the organic connection of the stage building with the audience room on a detached building site the theatre building as a complete and unified architectural work with the many practicable portions in several stories, the grand and nobly arranged stairways for access, and the effectively subdivided facade in several stories. Under the influence stood the enclosed Greater-Roman theatres at Aspendos and Sorre with their upper portions, over to the audience room, and their covered stages, where the planes no longer appeared in the overhang, but on a podium of moderate height, the logeion. Similar and arrangements produces built independently from the the theatre structure were already to be found in the Hellenistic theatres (Stoa of Eumenes at Athens). They indeed served the visitors to the theatre on occasion, but were just as loosely connected with the crowded as the stage.

Vitruvius devotes a general chapter (8 to 8, inclusive) in his book V to the antique theatre buildings in general and to

Sophocles, according to the anecdote of Alcibiades in Plutarch (16), as well as according to the notice of Aristotle (Poet. 4). And on Grecian theatres of the early and late Roman period (Nero to Marcus Aurelius), stone monumental and splendid architecture extended through two stories and enclosed the stage.

Of the mechanical arrangements of the theatre we know, that roller machines (ekkuklema) were in use, "on which was shown the interior, after the rear wall had been opened"; Further hoisting and flying machines (aiorema) on which gods and men appeared flying in the air (Eschylus, Prometheus etc.); also arrangements for thunder and lightning, traps for sinking through the wooden floors, stairways to the lower rooms, on which ghosts and erynnyes ascended and descended.

The parts of the Grecian theatre building were but loosely connected together and were not combined in an architectural art work. The audience room and the stage were only connected by stairways and do not appear as an organically coherent architectural work. The audience room required no external architecture by its peculiar location on the mountain slope. Roman art first created in the organic connection of the stage building with the audience room on a detached building site the theatre building as a complete and united architectural work with its shady promenade porticos in several stories, the grand and suitably arranged stairways for access, and the effectively subdivided facade in several stories. Under its influence stood the enclosed Grecian-Roman theatres at Aspendos and Bosra with their upper porticos, open to the audience room, and their covered stages, where the players no longer appeared in the orchestra, but on a podium of moderate height, the logeion. Shelter and promenade porticos built independently from the the theatre structure were already to be found in the Hellenistic theatres (Stoa of Eumenes at Athens). They indeed served the visitors to the theatre on occasion, but were just as loosely connected with the orchestra as the stage.

Vitruvius devotes a special chapter (8 to 9, inclusive) in his book V to the antique theatre building in general and to the Grecian and Roman theatre. He first desires for both a

sound plan, then states that the plan of the investigations will be easier, if the theatre is built on a mountain alone, then describes the plan of the stepped construction and of the stairs as well as the concentric passages. Then speaks of the acoustics, on the theory of harmony, on sound vases in the theatres, on the form of the Roman theatre in particular, and on the concerts of the singers in general. In conclusion he gives a few considerations on the choice of suitable sites for theatres and on the porticos behind the stage and the proscenium.

Here should be here given verbatim, what Vitruvius desires for the Greek theatre:--

"In the theatres of the Greeks all does not have to be arranged according to the same rules; for firstly, as in the better in theatre in the circle below describes the angles of four triangles, so this occurs here by the angles of three squares, since now where the site of such a stage background cuts off a circular arch (segmental) (a b) is drawn the limit of the stage, this border being drawn as a straight line (parallel) parallel to the base of the circular line, on which is placed the rear stand wall of the stage. Also through the centre of the orchestra is drawn a straight line parallel to the diameter of the front of the lower stage, and where this intersects the circle (e f) on the right and left at the ends of the semicircle, there is marked the centres, and afterwards one sees the difference in that on the right side (f) and described a circle from the left intermediate space (e) to the left side of the stage (d); and afterwards likewise set at the left end of the semicircle (e) is described a circle from the right interspace (f) to the right side of the front lower stage (h). --

Thus the Greeks by this circle described from 3 centres construct a more spacious orchestra and a stage facilitious set further back with a lesser depth of the stage framework. But the Greeks call this the logeion, because since with them only tragic and comic actors play on the stage, but the other artists appear in the orchestra; wherefore they are also in Greek termed by different names, stage actors (skenikai); those who sing on the stage) and orchestra actors (thymelikai;

sound plan, then states that the plan of the foundations will be easier, if the theatre is built on a mountain slope, then describes the plan of the stepped construction and of the stairs as well as the concentric passages, then speaks of the acoustics, on the theory of harmony, on sound vases in the theatres, on the form of the Roman theatre in particular, and on "the theatre of the Greeks"in chapter VII. In conclusion he gives a few considerations on the choice of suitable sites for theatres and on the porticos behind the stage and the promenades.

There should be here given verbatim, what Vitruvius desires for the Grecian theatre:--

"In the theatres of the Greeks all does not have to be executed according to the same rules; for firstly, as in the Latin theatre in the circle below touches the angles of four triangles, so this occurs here by the angles of three squares, since now where the site of such a stage background cuts off a circular arch (segmental) (a b) is drawn the limit of the stage, this border being drawn as a straight line (tangent) parallel to the edge of the circular line, on which is placed the rear grand wall of the stage. Also through the centre of the orchestra is drawn a straight line parallel to the direction of the front of the lower stage, and where this intersects the circle (e f) on the right and left at the ends of the semicircle, there is marked the centres, and afterwards one sets the compasses in that on the right side (f) and describes a circle from the left intermediate space (e) to the left side of the stage (g); and afterwards likewise set at the left end of the semicircle (e) is described a circle from the right interspace (f) to the right side of the front lower stage (h). --

Thus the Greeks by this circle described from 3 centres obtain a more spacious orchestra and a stage background set farther back with a lesser depth of the stage framework. But t the Greeks call this the logeion, because since with them only tragic and comic actors play on the stage, but the other artists appear in the orchestra; wherefore they are also in Greek termed by different names, stage actors (skeniker; those appearing on the stage) and orchestra actors (thymeliker;

be approaching in the theoria or orchestra). The height of [illegible] than 12 ft. The stairs between the radiae-shaped divisions and the seats should to the first semicircular passage have a direction corresponding to the angle of the square, from the first radiae walk being carried up other stairs in the middle between them, and thus they will always be doubled [illegible]

An account of the connection it may be mentioned here, that [illegible] ancient in the Roman theatre for the slopes of the audience room, where the seat-steps are arranged:--

[illegible] — [illegible] 4 ins.) and not over 1 1/2 ft. (18 ins.).

[illegible] — [illegible] that 1.94 ft. [1]

[illegible]

still see over the heads of each other, but it required occupying and not sitting for them. The height of 18 ins. for the step would nearly corresponds to our modern requirements, particularly if the use of a cushion be assumed. The greater depth of the seat from 22.8 to 28.0 ins. is therefore requisite, [illegible] seat more lower, wherefore a special depressor was generally cut in the upper surface of the step. The normal ratio of height to breadth of the step would thus be 40 to 74, or 4 to [illegible]

[illegible] theatres known to him, without taking into account the changes, which they experienced in the course of centuries by the alterations in the structure of the drama and in the mode of their presentation. He did not wish to write a history of the development of the Greek theatre, but merely to state just what was known to him.

Men have judged of the Greek theatre until the most recent times from the works of Vitruvius, and have deduced therefrom [illegible] to earlier and later periods was not [illegible]

those appearing in the thymele or orchestra). The height of this (stage) room should not be less than 10 ft. nor greater than 12 ft. The stairs between the wedge-shaped divisions and the seats should to the first semicircular passage have a direction corresponding to the angle of the square, from the first range walk being carried up other stairs in the middle between them, and thus they will always be doubled upwards f for each succeeding range walk".

On account of the connection it may be mentioned here, that Vitruvius (Book V, Chaps. 6, 3) prescribes the following dimensions in the Roman theatre for the slopes of the audience room, where the seat-steps are arranged:--

Height of step -- not less than a hand-breadth (thus about 4 ins.) and not over 1 1/2 ft. (18 ins.).

Width of the step -- not more than 2 1/2 ft. and not less that 1.94 ft. [1]

*Note 1. The Roman foot equals 16 digiti and 0.972 ft.*

With the small height of only 4 ins., the spectators could still see over the heads of each other, but it required crouching and not sitting for them. The height of 18 ins. for t the step would nearly correspond to our modern requirements, particularly if the use of a cushion be assumed. The greater depth of the seat from 23.6 to 29.0 ins. is therefore required, since it must receive the feet of those seated higher and seat those lower, wherefore a special depression was generally cut in the upper surface of the step. The normal ratio of height to breadth of the step would thus be 40 to 74, or 4 to 7 in round numbers. Vitruvius indeed had in mind for the preceding theatres known to him, without taking into account the changes, which they experienced in the course of centuries by the alterations in the structure of the dramas and in the mode of their presentation. He did not wish to write a history of the development of the Grecian theatre, but merely to state just what was known to him.

Men have judged of the Grecian theatre until the most recent times from the words of Vitruvius, and have deduced therefrom frequently false and contradictory conclusions. What belonged to earlier and later periods was not separated from each other,

[illegible] the sites, had taken the place of merely book learning, were our views enlarged. On the basis of fortunate finds and their thoughtful realization, we learned to recognize a history of the development of Grecian theatres, that we now divide in six periods, the oldest of which can be referred to the 6 th century B.C., and the latest to the time of Hadrian and of Marcus Aurelius (Patara, Aspendos. 2 )

Note 2. See Das Griechische Theater by Wilhelm Dörpfeld & Emil Reisch. Athens. 1896.

Our consideration may here be preceded by the graphical representation of what Vitruvius states to us (Fig. 413), where [illegible]

1. For the theatre of the earliest period (6 th century B. C.), it may be assumed, that it consisted of a circular place for dancing with the altar in the centre, around which the spectators gathered to hear and see the songs and dances, just as now at similar performances in the country. Sacrifice was offered on the altar before the beginning of the performance—the introductory solemn act!

2. In the next early period, i.e. in the 5 th century B.C., [illegible] ed on the ground of more numerous participation in the festivals, and correspondingly also the audience area, that must have been stepped, in order to afford to the persons standing in the farthest rows the opportunity for seeing and hearing better. Therefore men sought first for the natural slopes [illegible] were compelled by special conditions to resort to an architec-[illegible] may at first have consisted of wooden scaffolding, before men passed to stone construction. The dancing place was there not entirely surrounded by the rows of seats, but only for a little more than half, thus being left free in front and not enclosed by arrangements of any kind. The collecting of the spectators in a circle around the altar thereby disappeared.

all was cut on the same pattern, and only after thorough investigations, the results of excavations and discoveries on t the sites, had taken the place of merely book learning, were our views enlarged. On the basis of fortunate finds and their thoughtful realization, we learned to recognize a history of the development of Grecian theatres, that we now divide in six periods, the oldest of which can be referred to the 6 th century B.C., and the latest to the time of Hadrian and of Marcus Aurelius.(Patara, Aspendos. [2] ).

*Note 2. See Das Griechische Theater by William Dörpfeld & Emil Reisch. Athens. 1896.*

Our consideration may here be preceded by the graphical representation of what Vitruvius states to us (Fig. 413), where it is assumed, that Vitruvius assumes as the internal basal circle, the one forming the lowest row of seats.

1. For the theatre of the earliest period (6 th century B. C.), it may be assumed, that it consisted of a circular place for dancing with the altar in the centre, around which the spectators gathered to hear and see the songs and dances, just as now at similar performances in the country. Sacrifice was offered on the altar before the beginning of the performance--the introductory solemn act!

2. In the next early period, i.e. in the 5 th century B.C., the circular dancing place about the altar was indeed enlarged on the ground of more numerous participation in the festivals, and correspondingly also the audience area, that must have been stepped, in order to afford to the persons standing in the farthest rows the opportunity for seeing and hearing better. Therefore men sought first for the natural slopes of hills and arranged these for the said purpose, before they were compelled by special conditions to resort to an architectural stepped structure. It is not here excluded, that this may at first have consisted of wooden scaffolding, before men passed to stone construction. The dancing place was there not entirely surrounded by the rows of seats, but only for a little more than half, thus being left free in front and not enclosed by arrangements of any kind. The collecting of the spectators in a circle around the altar thereby disappeared.

In the first half of the century mentioned, in the time of Sebylus, and caused by the changes in the performances, the free space between the enclosing walls of the stadium theatre was occupied by a building -- the stage -- a one-story and later two-story building for the dressing of the actors, and which at first consisted of wood and woven fabrics, but in time was built of stone, with a changed treatment of the front wall. This stood before the stage and was soon extended as a prefixed architectural part, designated by the name of "proscenion" and architecturally treated. It front remained a one-story structure, but in time when the drama required it, became the stage building with an upper story, from which the gods appeared on the stage on foot or on a flying machine. The persons representing the god also then acted on the terrace roof of the proscenion! This in the sequence then receives and the stage were found two side entrances to the orchestra, the "parados", by which both the spectators, the chorus and the actors, who came from the city or a distance, entered the orchestra. Dörpfeld thus speaks:-- (p. 276).:--

"During the play the chorus remained in the orchestra. The actors almost exclusively remained in that part of the orchestra, which lies as a rectangle directly before the stage. They did not ascend any platform, but when they did not occupy the step of the altar or some steps of the stage, were on the floor of the orchestra with the chorus. Only when the business of the drama required did there appear in exceptional cases one or even several actors on the roof of the stage or more properly of the proscenion, either as a person with something to do on the roof of the building, or as a god on this terrace roof, termed "theologeion". Again in the earliest time the orchestra, alter and audience area were the most important parts of the theatre -- [illegible]

the second period the stage and audience room." But the orchestra must not be omitted there and the freedom of action of the players at all begrets of the building was thus unrestricted.

In the first half of the century mentioned, in the time of Eschylus, and caused by the changes in the performances, the f free space between the enclosing walls of the stepped theatre was occupied by a building -- the stage -- a one-story and later two-story building for the dressing of the actors, and which at first consisted of wood and woven fabrics, but in time was built of stone, with a changed treatment of the front wall. This stood before the stage and was soon extended as a prefixed architectural part, designated by the name of "proscenion" and architecturally treated. It first remained a one-story structure, but in time when the drama required it, became the stage building with an upper story, from which the gods appeared on the stage on foot or on a flying machine. The person representing the god also then acted on the terrace roof of the proscenion! This in the sequence then received projecting side wings -- the "parascenion", as the endings of the permanent structure. Between the area for the spectators and the stage were found two side entrances to the orchestra, the "paradoi", by which both the spectators, the chorus and the actors, who came from the city or a distance, entered the orchestra. Dörpfeld thus speaks:-- (p. 375).:--

"During the play the chorus remained in the orchestra. The actors almost exclusively remained in that half of the orchestra, which lies as a rectangle directly before the stage. They did not ascend any platform, but when they did not occupy the step of the altar or some steps of the stage, were on the floor of the orchestra with the chorus. Only when the business of the drama required did there appear in exceptional cases one or even several actors on the roof of the stage or more properly of the proscenion, either as a person with something to do on the roof of the building, or as a god on this terrace roof, termed "theologeion". While in the earliest time the orchestra, altar and audience area were the most important parts of the theatre, we must designate as such in t the second period the stage and audience room." But the orchestra must not be omitted there and the freedom of action of the players at all heights of the building was thus unrestricted.

3. The buildings of the third period, thus c[illegible] building. "For only those parts, that had already been constructed as a permanent building, were built of stone. The "ornamental wall" closed before the stage and between the parascenia in the 4 th century must also have been still constructed of wood and cloth, since in the various dramas it must represent the buildings". The audience room was developed into a broad structure with stone seats! Thus -- Dörpfeld.

4. The buildings of the Roman period fall in the Hellenistic time, in which the proscenion was built of better material as a permanent structure, for which Priddemore is mentioned as an example, but without sufficient certainty. The front wall consists of stone columns or half columns, whose intervals could be closed by wooden panels, curtains. (Finakes). [illegible] the middle of the wall is arranged but one doorway, yet the [illegible]

The height of the proscenion varies in dimensions from 3.7 to 11.4 ft. As Dörpfeld is of opinion, "this may be fixed in the time, when the houses did not average higher", and [illegible] the "[illegible] have little force. Yet so much is fixed, that the [illegible] of the 3 rd and 4 th centuries, so that in it actors [illegible] clearly in and beside the circular orchestra and before the proscenion forming a reminiscence. We agree with the earlier [illegible] — "Of this [illegible] the proscenion for other reasons".

5. [illegible] stages of the early and late imperial periods, which were required under Roman influences to experience a change in plan, when men established the chorus. The orchestra then became superfluous as a place for the play, and only the audience room and the stage with its proscenion could be retained, but again in only with the same alterations. [illegible] in extent, the rink of plays was omitted, the proscenion was [illegible]

3. The buildings of the third period, thus of the 4 th century, based on the same plan, exhibit a partly stone stage building. "For only those parts, that had already been constructed as a permanent building, were built of stone. The "ornamental wall" placed before the stage and between the parascenions in the 4 th century must also have been still constructed of wood and cloth, since in the various dramas it must represent the buildings". The audience room was developed into a grand structure with stone seats! Thus -- Dörpfeld!

4. The buildings of the fourth period fall in the Hellenistic time, in which the proscenion was built of better material as a permanent structure, for which Epidaurus is mentioned as an example, but without sufficient certainty. The front wall consists of stone columns or half columns, whose intervals could be closed by wooden panel paintings.(Pinakes). At the middle of the wall is arranged but one doorway, yet the use of intermediate rooms with additional doors is not excluded. The height of the proscenion varies in dimensions from 9.7 to 11.4 ft. As Dörpfeld is of opinion, "this may be fixed in the time, when the houses did not average higher", and which the proscenion should represent. The explanations and the basis have little force. Yet so much is fixed, that the Hellenistic theatre only differs in monumental details from those of the 5 th and 4 th centuries, so that in it actors and chorus still played in the same places as earlier, particularly in and beside the circular orchestra and before the proscenion forming a background. We agree with the earlier words of Dörpfeld:-- "If they were not busied on the roof of the proscenion for other reasons".

5. In the fifth and sixth periods are to be placed the theatres of the early and late imperial periods, which were required under Roman influences to experience a change in plan, when men abolished the chorus. The orchestra then became superfluous as a place for the play, and only the audience room and the stage with its proscenion could be retained, but again only with the same alterations. The orchestra was reduced in extent, the ring of slabs was omitted, the proscenion was moved nearer the spectators, when this must shrink into a low

stage specifically, since the ancient place for the play was reserved by seats for distinguished spectators.

According to Vitruvius, it should not be more than 5 ft. high, so that the spectators in the orchestra might be able to see the movement of all actors appearing. The proscenium became the front wall of the stage, its roof was the floor for the play, the front wall of the stage became the monumental background of the stage, in several stories; the stage area was long and narrow and covered by an inclined ceiling. The parades remained in the ancient places, but came to lie beneath the outermost row of seats.

But one may also break out another path and say, that everything remained as in the old theatre, and that only the orchestra (besides its reduction) was excavated deeper, whereby the front walls of the proscenium must sink and receive a different form, while the rear wall of the old proscenium with the parascenium increased to a height of even 5.56 ft. But this belongs in the domain of imagery and alters nothing in the preceding result.

Yet much of this was already observed before the classification of Greek theatres, and it was ascribed to by all those who did not forget that the transition from the Greek orchestra to the Roman was also merely itself apparent structurally, and transitions of this sort can give nothing radically novel. Much would be brought by architecture into the correspondent form, if the poetry had demanded a new procedure.

But to emphasize one thing beforehand: the specialtoured impulse in both theatres and the advance in respect to aesthetics, which the Roman theatre has made as an architectural work in comparison to the Greek. Its apparatus was [illegible] besides the changed mode of playing.

The characteristics of all periods mentioned, of the 6 th, 5 th and 4 th centuries B.C., of the Hellenistic period, of the early Roman under Nero and of the later Roman under Shakespeare are shown at the Theatre of Dionysos in Athens, according to the statements of Dörpfeld (p. 1-55, pls. I-V), and may be followed, and the differences be recognized, when some proof-

stage scaffold, since the ancient place for the play was occupied by seats for distinguished spectators.

According to Vitruvius, it should not be more than 5 ft. h high, so that the spectators in the orchestra might be able to see the movement of all actors appearing. The proscenion became the front wall of the stage, its roof was the floor for the play, the front wall of the stage became the monumental background of the stage, in several stories; the stage area was long and narrow and covered by an inclined ceiling. The parades remained in the ancient places, but came to lie beneath the outermost row of seats.

But one may also break out another path and say, that everything remained as in the old theatre, and that only the orchestra (besides its reductions) was excavated deeper, whereby the front walls of the proscenion must sink and receive a different form, while the rear wall of the old proscenion with the parascenion incheased to a height of even 6.56 ft. But this belongs in the domain of jugglery and alters nothing in the preceding result.

Yet much of this was already observed before the classification of Grecian theatres, and it was adhered to by all those, who did not forget that the transition from the Grecian drama to the Roman must also make itself apparent structurally, and transitions of this sort can give nothing radically novel. Such would be brought by architecture into the corresponding form, if the poetry had demanded a new programme.

But to emphasize one thing heretofore neglected, the architectural impulse in both theatres and the advance in respect to esthetics, which the Roman theatre has made as an architectural work in comparison to the Grecian. Its advantages were introduced in most Grecian theatres of the periods mentioned, besides the changed modes of playing.

The characteristics of all periods mentioned, of the 6 th, 5 th and 4 th centuries B.C., of the Hellenistic period, of the early Roman under Nero and of the later Roman under Phaidros are shown at the Theatre of Dionysos in Athens, according to the statements of Dörpfeld (p. 1-96, pls. I-V), and may be followed, and the differences be recognized, when some probl-

problematical things must also be taken in the [illegible]

Passing to the details, as these still exist or have existed together, let the orchestra be first considered, and indeed as the oldest example, that of the Theatre of Dionysos in Athens. On Plate III and page 27, Dörpfeld gives as lying 5.9 ft. beneath the pavement of the present orchestra, a piece of wall about 2.95 ft. high and 11.4 ft. long in a circular curve and built of polygonal stones, taking this as a part of the wall enclosing a circular place 78.0 ft. in diameter, which he makes known as the first orchestra of the said theatre, continuing on page 28:28 "If we could determine from the ruins the magnitudes of the orchestras of the 6 th and 5 th centuries, they would unfortunately afford us no conclusions on their arrangement for performances. No piece of the original pavement of the orchestra is preserved in its original form, [illegible] knowledge of an older structure, that might have stood in the middle of the circle or on its edge". The ruins refuse the information. It is otherwise for the Theatre in Priene, that Dr. P. Karbedias began to excavate and to clear up in the year 1891, and the scientific results of which investigation are published in "Ganzitle".(Athens. 1898). He first in the [illegible] bulletins of Polycletus meet with the said reconstruction of an orchestra of the middle of the 4 th [illegible] res may be deduced, and indeed justly so, as we have to do with a correct thing. The orchestra is surrounded by a circular ring of slabs 1.29 ft. wide and of hard white limestone. It lies at the same height on the pavement of the orchestra, by which is indicated no covering of any kind, neither a coating nor a covering of slabs. (Fig. 414; after Praktika. 1898. Plate 2).

The ring is closed at a distance of 6.9 ft. from the bottom circle of the lowest row of seats. The space between this and the ring is made somewhat lower along the southern half of the circle, as a wide collecting gutter for the rain water [illegible]

problematical things must also be taken in the bargain, such as attempts at restoration in plan and elevation etc.

Passing to the details, as these still exist or harmonize together, let the orchestra be first considered, and indeed as the oldest example, that of the Theatre of Dionysos in Athens. On Palte III and page 27, Dörpfeld gives as lying 5.9 ft. beneath the pavement of the present orchestra, a piece of wall about 3.28 ft. high and 11.4 ft. long in a circular curve and built of polygonal stones, taking this as a part of the wall enclosing a circular place 79.0 ft. in diameter, which he makes known as the first orchestra of the said theatre, continuing on page 33:66 "If we could determine from the ruins the magnitudes of the orchestras of the 6 th and 5 th centuries, they would unfortunately afford us no conclusions on their arrangement for performances. No piece of the original pavement of the orchestra is preserved in its original form, and neither a foundation nor a dressed rock gives the least knowledge of an altar structure, that might have stood in the middle of the circle or on its edge". The ruins refuse the information. It is otherwise for the Theatre in Epidauros, that Dr. P. Kabbadias began to excavate and to clear up in the year 1881, and the scientific results of which investigation are published in "Praktika".(Athens. 1906). We first in the celbrated theatre building of Polycletus meet with the safe representation of an orchestra of the middle of the 4 th century B.C., according to which all further theatre structures may be deduced, and indeed justly so, as we have to do with a correct thing. The orchestra is surrounded by a circular ring of slabs 1.28 ft. wide and of hard white limestone. It lies at the same height on the pavement of the orchestra, by which is indicated no covering of any kind, neither a coating nor a covering of slabs. (Fig. 414; after Praktika. 1888. Plate 2).

The ring is placed at a distance of 6.9 ft. from the bottom circle of the lowest row of seats. The space between this a and the ring is made somewhat lower along the southern half of the circle, as a wide collecting gutter for the rain water falling from the theatre steps, which at both ends of the gut-

gutter is led through two openings into a subterranean sewer. The place for the play is thus kept dry, but is somewhat reduced by this plan.

Tangential to the circle of slabs rises the front of the proscenion, which on account of the said reduction of the orchestra by the ring of slabs is again moved somewhat nearer the spectators, but not at all as near as Vitruvius' rule in reference to the bottmo circle for the first row of seats requires.

In the middle of the orchestra lies a circular stone 2.31 ft. in diameter with a hole in the centre, which may be regarded as the foundation for a round altar, but which may likewise have served as an immovable centre in laying out the circular lines of the rows of seats.

An allied arrangement of a channel, only 3.47 ft. deep and 2.98 to 3.15 ft. wide, covered by partially perforated slabs, is found in the Theatre of Dionysos at Athens, but which does not run concentric with the base circle, whose centre is much nearer the audience room, in order to not require the stage to be placed too far back in retaining the full circular form of the orchestra.

The same"sunken passage", that separated the orchestra from the audience room, served as a collecting channel for rain water and was continued to the sea as a subterranean drain, is found at the Theatre in Eretria, where the pavement of the orchestra was coated with lime wash.

Likewise at the Theatre in Sicyon was a larger water channel, that was carried from the middle of the audience room under the orchestra and stage, conducting the rain water outside.

There was further determined a deep channel in the great T Theatre at Megalopolis, which extended directly before the seats (of honor) along the lowest row of steps.

On the contrary, in the Theatre at Oropos are lacking the channel and the passage to the rows of seats, instead of which there stand five marble thrones with inscriptions in a semicircle on the unpaved area, which limit the orchestra and make possible the circle of slabs before this to the proscenion. (Fig. 415).

Such seats of honor, also five in number, with an aisle in the same circle as the seats, makes possible in the Theatre at Priene the drawing of the full circle in the orchestra. (Fig. 41a). The passage between the enclosure and the seats 5.0 to 5.1 ft. wide, and it also served as a channel for water.

At the Theatre of Dionysos in Athens, during the Hellenistic period, the entire lower row of steps consisted of such with a marble enclosure next the orchestra -- thus between the semi water channel and the lowest step. The pavement of slabs now existing in the orchestra belongs to the latest period.(Archon Phaidros). On Delos the orchestra had a mosaic pavement. Under the floor of the orchestra are now frequently but on account of their size may be designated as passages as the so-called Charon's passages. One such is still found in the Theatre at Pergia, leading from the middle of the orchestra beneath the pavement of the proscenion.

At the Theatre in Sicyon are preserved portions of a water channel beneath the pavement of the orchestra, which led from the centre of the orchestra to the hyposcenion. It exists for this distance a larger cross section and may indeed have

Drawing the Theatre in Marmaria-s-K. has such a channel, that outlining.(4 th century and 3 rd century B.C.).

passage could not be determined. Earth covered the orchestra ice were found.

By the stratigraphy now available, it is proved that a circle of slabs in the orchestra tangent to the lowest row of seats of the audience room and to the ornamental wall of the proscenion can be drawn, and that its diameter was reduced at pleasure by the placing of throne seats or by an eccentric location. -- when the centre of the ring of slabs did not coincide

Such seats of honor, also five in number, with an altar in the same circle as the seats, makes possible in the Theatre at Priene the drawing of the full circle in the orchestra. (Fig. 416). The passage between the enclosure and the ascending audience room is paved with carefully joined ashlars, 6.0 to 6.1 ft. wide, and it also served as a channel for water.

At the Theatre of Dionysos in Athens, during the Hellenistic period, the entire lower row of steps consisted of such seats of honor (Fig. 417), before which extended a passage w with a marble enclosure next the orchestra -= thus between the said water channel and the lowest step. The pavement of slabs now existing in the orchestra belongs to the latest period.(Archon Phaidros). On Delos the orchestra had a mosaic pavement. Under the floor of the orchestra are now frequently found arched passages, that served as channels for water, but on account of their size may be designated as passages connecting the altar and the interior of the stage building, as the so-called Charon's passages. One such is still found in the Theatre at Eretria, leading from the middle of the orchestra beneath the pavement of the proscenion.

At the Theatre in Sicyon are preserved portions of a water channel beneath the pavement of the orchestra, which led from the centre of the orchestra to the hyposcenion. It exhibits for this distance a lerger cross section and may indeed have served as a Charon's passage between the two points mentioned. Likewise the Theatre in Magnesia-a-M. has such a channel, that extends from the middle of the orchestra to beneath the stage building.(4 th century and 3 rd century B.C.).

By the new excavations in Priene, on the contrary, a Charon's passage could not be determined. Earth covered the orchestra floor; neither pavement nor vestiges of any wooden construction were found.

By the structures now available, it is proved that a circle of slabs in the orchestra tangent to the lowest row of steps of the audience room and to the ornamental wall of the proscenion can be drawn, and that its diameter was reduced at pleasure by the placing of throne seats or by an eccentric location, -- when the centre of the ring of slabs did not coincide

with the basal circle. The placing of the thron-
ood the diameter of the orchestra ring, and the eccentric
cler brought the observer somewhat nearer the stage. (See
groups plan of Theatre of Dionysos in Athens, Fig. 412 ).

The form of the orchestra is not everywhere the same. Thus
it formed a circle extended to a square (!), while in Th-
ricos it was actually the square form with angles rounded
off on one side.(Fig. 412). On the other hand, in the Thea-
tre in Priene it is strictly horseshoe shaped, correctly agree-
ing with the rule of Vitruvius, just as for the Theatres on
ira, Delphi and Athens at a certain time. Likewise the Thea-
more than semicircular form, as well as those in Asia Minor
at Iasos, Telmissos, Aizani etc. In Assos we only meet with
angles projecting somewhat more and the same form again as at
the theatres in Pyrenus and in Eretria. On the contrary, ap-
amples remaining to us!

"--- There are things, which in regard to the purposes in
which are the steps, the concentric passages, the balustrades,
-- so that no inconvenience may result". By this principle
Vitruvius has again been justified by the structures!

Also in the following:-- "If for the construction any build-
ing material be lacking, marble, wood or other things, it is
not
ther improper to omit or to add something, if it can be done
with moderate reduction, the architect is experienced, has an
active mind and does not lack the gift of design".

be enclosed by a somewhat more than semicircular wall, concen-
tric with the great circle of the lowest seat-step. This is
so in Epidauros; but not in places where the conditions of
the site present difficulties. This sufficiently appears fr
from the plans of the theatres of Athens,

with the basal circle. The placing of the throne seats reduced the diameter of the orchestra ring, and the eccentric plan brought the observer somewhat nearer the stage. (See ground plan of Theatre of Dionysos in Athens, Fig. 418 [1] ).

*Note 1. After the plate by Dörpfeld and Reisch.*

The form of the orchestra is not everywhere the same. Thus for example, at the Theatre in Priene, according to Dörpfeld, ft formed a circle extended to a square"(sic!), while in Thoricos it was actually the square form with angles rounded off on one side.(Fig. 419). On the other hand, in the Theatre in Priene it is slightly horseshoe shaped, chiefly agreeing with the rule of Vitruvius, just as for the Theatres on Delos, in Oropos, Epidauros, Sicyon, Magnesia-a-M., Megalopolis, Delphi and athens at a certain time. Likewise the Theatres on Sicilian soil, in Egesta and Syracuse, exhibit the more than semicircular form, as well as those in Asia Minor at Iassos, Telmissos, Aizani etc. In Assos we only meet with angles projecting somewhat more and the same form again as at the theatres in Piraeus and in Eretria. On the contrary, Aspendos exhibits a strongly Roman arrangement. If exceptions prove the rule, then Vitruvius is right, according to the examples remaining to us!

"--- Thera are things, which in regard to the purpose in both a small and a great theatre must be made of the same size, which are the steps, the concentric passages, the balustrades, -- so that no inconveniences may result". By this principle Vitruvius has again been justified by the structures!

Also in the following:-- "If for the construction any building material be lacking, marble, wood or other things, it is then not improper to omit or to add something, if it can be done with moderate reduction, the architect is experienced, has an active mind and does not lack the gift of design".

The audience room, the theatre proper, Vitruvius desires to be enclosed by a somewhat more than semicircular wall, concentric with the great circle of the lowest seat-step. This is so in Epidauros; but not in places where the conditions of t the site present difficulties. This sufficiently appears fr from the plans of the theatres of Athens, Delphi, on Delos,

in Thoricos and Pergamon.

It was mentioned in commencing, that in the earliest period the natural slopes, as they occurred, were utilized as audience areas. This simplest kind was then succeeded by inclined structures built of wood, which was indeed probable and possible, only when their former occurrence is not based on principles, as for example given in Dörpfeld (p. 100, 101) for t the Theatre in Oropos:-- "The form of the audience room is n not accurately known, since only a single semicircular wall and portions of the supporting walls have been uncovered. The Theatre can never have had rows of stone seats, since with the good condition of preservation of the thrones standing in the orchestra and of the entire stage building, the removal of all seat-steps is not to be thought. Therefore the spectators must have had wooden seats, whose traces are also to be seen plainly on the foundation walls. Hence we have here a good example for a theatre area with wooden seats, just as we must assume them for Athens in the 5 th century." These conclusions are certainly not compulsory! Was the Parthenon covered with shingles, because not a single piece of its marble tiles is found today? Of what material were the cornices on the Temple of Rome and Venus? Certainly not of wood, even if they have also entirely disappeared! [1]

*Note 1. Concerning the good preservation of the stage building the said author says:-- "That parts of the walls were n not found, only extending to 6.56 ft. high, but that half columns and angle piers were still standing when excavated, but were later overthrown, when they were broken. The corresponding entablature blocks lay around on the ground. The height of the columns could not be accurately determined, but the entire height of the proscenion must be assumed at 8.2 ft. Judging from the holes behind the cornice blocks, the ceiling of the proscenion was constructed of wood. A restoration of the stage with its assured (sic) superstructure is represented on page 108, but it should be further noted in reference thereto, that the height of the superstructure cannot be determined! In what then does the good condition of preservation of "the entire stage building" consist? The proscenion in Priene affords more, as we shall see later.*

To the Dionysos and temporary audience room, eventually no longer proved to be constructed of wood, succeeded the monumental theatre of stone. The artificially constructed stone seats were indeed preceded by those cut in the solid rock. In both cases was utilized as a building site the natural slope of the land, whereby more expensive substructures, stairways and treatment of the facade were avoided. To these statements correspond the still preserved structures.

[illegible] of a number of seat-steps, in most cases extending concentrically around the orchestra, which in ever increasing circular area, so far as their full course was permitted by the conditions of the building site (see the representations in Athens, Delos etc.) --- there rising as an inclined line of moderate [illegible], and they either rested on the rock prepared to receive them. (See Theatre of Dionysos in Athens, Theatres in Teormina and Syracuse, the latter, from the 5 th century B.C., after Mile-tus and Megalopolis was the greatest of the Greeks world with a diameter of 456 ft. and 45 rows of seats, of which the 11 lowest were covered with marble), or in special cases on coursed rubble masonry or on cobbled stone slabs, as on the Theatre in Aizani.(Fig. 420). Seats constructed of several blocks are shown by the theatres in Priene and in Magnesia-a-M.

A termination next the stage was given to the rows of seats by oblique or stepped inclined side walls, over which the spectators could look toward the stage, though not always conveniently from the corner places. These side walls extended radially in most cases, but were also placed parallel to the proscenion wall, as in Epeata. With reference to the possibility of good vision toward the stage, the rows of seats were not always extended to the inner surface of the wall, but rather in correct recognition of the conditions, a stairway was inserted. The straight and narrow stairways were arranged as needed and in accordance with the size of the theatre, not in all cases as the rule established by Vitruvius required. They subdivided the audience room into wedge-shaped divisions (ter-[illegible]

To the dangerous and temporary audience room, actually no longer proved to be constructed of wood, succeeded the monumental theatre of stone. The artifically constructed stone seats were indeed preceded by those cut in the solid rock.In both cases was utilized as a building site the natural slope of the land, whereby more expensive substructures, stairways and treatment of the facade were avoided. To these statements correspond the still preserved structures.

Therefore in the stone theatre the audience room consists of a number of seat-steps, in most cases extending concentrically around the orchestra, which in ever increasing circular arcs, so far as their full course was permitted by the conditions of the building site (see the representations in Athens, Delos etc.) -- there rising as an inclined line of moderate inclination. The steps were mostly wrought from stone blocks, and they either rested on the rock prepared to receive them. (See Theatre of Dionysos in Athens, Theatres in Taormina and Syracuse, the latter, from the 5 th century B.C., after Miletus and Megalopolis was the greatest of the Grecian world with a diameter of 492 ft. and 46 rows of seats, of which the 11 lowest were covered with marble), or in special cases on coursed rubble masonry or on corbelled stone slabs, as on the Theatre in Aizani.(Fig. 420). Seats constructed of several blocks are shown by the theatres in Priene and in Magnesia-a-M.

A termination next the stage was given to the rows of seats by oblique or stepped inclined side walls, over which the spectators could look toward the stage, though not always conveniently from the corner places. These side walls extended radially in most cases, but were also placed parallel to the proscenion wall, as in Egesta. With reference to the possibility of good vision toward the stage, the rows of seats were not always extended to the inner surface of the wall, but rather in correct recognition of the conditions, a stairway was inserted. The straight and narrow stairways were arranged as needed and in accordance with the size of the theatre, not in all cases as the rule established by Vitruvius required. They subdivided the audience room into wedge-shaped divisions (kerkides), that upwards are interrupted by one or two concentric

theatre. The number of the inserted stairways is generally doubled in the upper ranges on account of the greater perimeter.

the parados. When permitted by the conditions of the site, other separate means of access from the exterior were made possible by ramps or by ladders to the upper ranges. (See Athens, Delos etc.). From the concentric passages, which were enclosed on one side by a vertical wall as high as the width of the passage, separate stairways were arranged at definite intervals, that the spectator sometimes had to follow to the height of the lowest step of the next range.(Fig. 484: Aspendos, Sparta). On the ground plans of theatres in Asia Minor in the last period, the treatment of the seat-steps is simpler, and richer execution is represented by Fig. 482. In Athens were seen the traces of the [illegible] by [illegible], in [illegible] [illegible] [illegible] [illegible] where of stone ramps, for example in Epidauros. The normal lowest row of seats next the orchestra, as already stated, in many places is replaced by more convenient and richly wrought marble seats with backs (Athens, Gortyna, Priene); they were destined as seats of honor for generals, state officials, foreign and native guests of honor. Beautiful examples of such are preserved in Athens and Priene. Their seats are wrought lower at the back, indeed to afford a better hold for the cushion laid thereon or the rolled toga.

[illegible] uppermost row of seats was formed by a simple plain masonry wall, that in buildings of the last period and erected under Roman rule was replaced by shady porticos closed externally, as completely preserved in Aspendos and practically so in Side. [illegible] likewise arranged in the earlier period, not as organic parts of the theatre building, but as separate architectural structures in the vicinity of the theatre.(Athens, Pergamon). The uncovered external walls were courses in great fivestone masses without the aid of mortar and iron, either covered by

passages (diazomata), thus forming two or three ranges in the theatre. The number of the inserted stairways is generally doubled in the upper ranges on account of the greater perimeter.

The ascent to the ranges occurred from the orchestra through the paradoi. When permitted by the conditions of the site, other separate means of access from the exterior were made p possible by ramps or by ladders to the upper ranges. (See Athens, Delphi etc.). From the concentric passages, which were enclosed on one side by a vertical wall as high as the width of the passage, separate stairways were arranged at definite intervals, that the spectator sometimes had to follow to the height of the lowest step of the next range.(Fig. 421; Aspendos, Bosra). On the ground plans of theatres in Asia Minor in the last period, the treatment of the seat-steps is simpler, and richer execution is represented by Fig. 422. In Athens were the treads of the steps roughened by grooves, to prevent the visitor from slipping, a precaution also found elsewhere on stone ramps, for example in Epidauros. The normal lowest row of seats next the orchestra, as already stated, in many places is replaced by more convenient and richly wrought marble seats with backs (Athens, Oropos, Priene); they were bestowed as seats of honor for generals, state officials, foreign and native guests of honor. Beautiful examples of such are preserved in Athens and Priene. Their seats are wrought lower at the back, indeed to afford a better hold for the cushion laid thereon or the rolled toga.

Where the steps did not end on the slope, the ending of the uppermost row of seats was formed by a simple plain masonry wall, that in buildings of the last period and erected under Roman rule was replaced by shady porticos closed externally, as completely preserved in Aspendos and practically so in Bosra. Promenade porticos affording shelter from weather were likewise arranged in the earlier period, not as organic parts of the theatre building, but as separate architectural structures in the vicinity of the theatre.(Athens, Pergamon). The unbroken external walls were coursed in great limestone ashlars without the aid of mortar and iron, either covered by

faced with marble slabs. On the Dalfieristic building of the Theatre at Eubosus, also in Tyrene and on the side wall of the Theatre at Magnesia-s-M came into use ashlars with bosses and cut marble at the end joints, as well as on the exterior of the theatre at Alinda. (See Ch. [illegible], also particulars of Prosian Museum on Magnesia-s-M.).

The dimensions of the stone for the auditorium varied greatly, in accordance with their purpose of seating a great number of men; thus for example, the theatres were:--

| | |
|---|---|
| Athens | 170.00 ft. |
| Sparta | [illegible] ft. |
| Tralles | [illegible] ft. |
| Tyrrhia | [illegible] ft. |
| Syracuse | 498.00 ft. |
| Dionysia | [illegible] ft. |

Herod. the Sophist says that Dionysos in Athens seated 30,000 men, while the Theatre of Dionysos in Athens seated 30,000, and that in Laodicia could accommodate 10,000 (100,000 ?) spectators.

The [illegible] "[illegible] and beauty". (Vitruvius, Book II, 2?).

The [illegible] this does not seem to have been the case always.

The proposal of Vitruvius to make special arrangements in the theatres in order to increase "the distinctness of the v[illegible] masonry of rough stone, ashlars, or marble, and which material cannot resound, he decrees the arrangement of acoustic vasels in the audience room, that are especially designed to [illegible] in a semicircular form from the stage as a centre and enter

marble slabs (Aizani) or in which limestone without mortar, as in Myra and Iassos; or they appear as walls of split stone faced with marble slabs. On the Hellenistic building of the Theatre at Ephesus, also in Priene and on the side wall of the Theatre at Magnesia-a-M came into use ashlars with bosses and cut margins at the end joints, as well as on the exterior of the Theatre at Alinda. (See De Bas.II,2; also publications of Prussian Museum on Magnesia-a-M.).

The dimensions of the space for the audience were chiefly great, in accordance with their purpose of seating a great number of men; thus for example, the theatres were:--

| | |
|---|---|
| Aizani | 183.68 ft. in diameter. |
| Egesta | 206.64 ft. |
| Iassos | 246.00 ft. |
| Cyzicos | 328.00 ft. |
| Syracuse | 492.00 ft. |
| Laodiceia | 492.00 ft. |

Among the greatest were the theatres in Miletus and Megalopolis (See Pausanias, Book VIII), the latter seating 44,000 men, while the Theatre of Dionysos in Athens seated 30,000, and that in Laodiceia could accommodate 10,000 (100,000 ?) spectators.

The most beautiful theatre is admitted to be that built in Epidauros by Polycleitos, "the most important in proportions and beauty". (Pausanias, Book II, 27).

The voices of the actors should also be loud and clearly u understood by the most distant auditors; but with the considerable dimensions and the uncovered location of the theatre, this does not seem to have been the case always.

The proposal of Vitruvius to make special arrangements in the theatres in order to increase "the distinctness of the v voices" of the actors, certainly relates to this.

Therefore in theatres built of solid materials, i.e., of masonry of rough stone, ashlars, or marble, and which material cannot resound, he desires the arrangement of acoustic vessels in the audience room, that are especially designed to increase the distinctness of the tones, which proceed outward in a semicircular form from the stage as a centre and enter

states, that theatres were annually built in Rome without any attention to such acoustic vessels: he even says that none of these were to be found in Rome; but there were such in the provinces of Italy and in most Grecian cities. L. Mummius brought such acoustic vessels to Rome after the destruction of Corinth. But this arrangement is not mentioned in all ancient literature now known; only the anonymous author of the essay "De Rebus Bellorum Theatrum Scenarum ac Scenicorum ordine Consuetudine" mentions them.[1] In the numerous known theatres on the soil of Italy, Sicily, Greece and Asia Minor, no acoustic vessels nor even vestiges of them have been discovered. One is therefore tempted to support Terzier's opinion, according to which Vitruvius indeed speaks of his own invention, which was not adopted.

Note 1. See Vitruvius' zehn Bücher über Architektur. Translated by F. Reber, Stuttgart, 1868. p. 147. Note 1.

[illegible] clent means to provide these, then "resonant pottery vessels," etc., "and indeed so, that when they are struck, they can give in the separate vessels the tone of the fourth, fifth, and the entire series ascending up to the double octave". Then are a [illegible] placed in small cells built beneath the seats of the theatre, in accordance with their musical order, and so that they touch no wall, have space around them, with an open space likewise at the upper open end; they should be set traversed and have wedges beneath them on the side next the stage, [illegible] lower stage. The arrangement of the sound oscillates "in the [illegible] in a filled house.

[illegible] 15 chambers separated by 12 equal intervals, in the bottom of the first concentric passage. The peculiar form of the substructure of the concentric passage of the Theatre in Ainsur

the cavities of the acoustic vessels, thus producing by a combination of sounds a corresponding harmony. He indeed states, that theatres were annually built in Rome without any attention to such acoustic vessels; he even says that none of these were to be found in Rome; but there were such in the provinces of Italy and in most Grecian cities. L. Mummius brought such acoustic vessels to Rome after the destruction of Corinth. But this arrangement is not mentioned in all ancient literature now known; only the anonymous author of the essay "De Fabularum Ludorum Theatorum Scenarium ac Scenicorum antiqua Consuetudine" mentions them. [1] In the numerous known theatres on the soil of Italy, Sicily, Greece and Asia Minor, no acoustic vessels nor even vestiges of them have been discovered. One is therefore tempted to support Texier's opinion, according to which Vitruvius indeed speaks of his own invention, which was not adopted.

*Note 1. See Vitruvius' zehn Bücher über Architektur. Translated by F. Reber. Stuttgart. 1865. p. 147. Note 1.*

Vitruvius prefers bronze vessels, or if there be not sufficient means to provide these, then "resonant pottery vessels;" they should be made in proportion to the magnitude of the theatre, "and indeed so, that when they are struck, they can give in the separate vessels the tone of the fourth, fifth, and the entire series extending up to the double octave". Then are a afterwards placed in small cells built beneath the seats of the theatre, in accordance with their musical order, and so that they touch no wall, have space around them, with an open space likewise at the upper open end; they should be set inverted and have wedges beneath them on the side next the stage, at least 1 1/2 ft. high; corresponding to these cells, openings 2 ft. long and 1 1/2 ft. high are left in the beds of the lower steps. The arrangement of the sound openings "in the beds of the lower steps" makes the entire scheme very problematical in a filled house.

For theatres of not too great dimensions, Vitruvius requires 13 chambers separated by 12 equal intervals, in the height of the first concentric passage. The peculiar form of the substructure of the concentric passage of the Theatre in Aizani exhibits 13 such divisions; one is tempted to assume these to

re spectator seats (Fig. [illegible]), since the center and location corresponded to the statements of Vitruvius, and the proportions of the Lacking remts may be easily made to satisfy the [illegible]

a row of seats, whose form was required by the conditions of the ground, the inclination of the stoa-seats, and the plan [illegible] acoustic chambers etc. In Epidauros and Lytios are ros terrated underneathority.

Vitruvius requires three horizontal series of chambers for great theatres, the first for the harmonic scale, the second for the chromatic, and the third for the diatonic scale.

The visual distances for the most distant spectators are no less to be mentioned, since they amount to--

Palmisano 152.00 ft.

[illegible]

Yet the spectator easily convinces at a glance the concepts and the stage, the "unrealistic" and its "secondary" lies fig. 42-1); such occurrences as the concert of the distant [illegible] the group of players are sometimes moved in horizontal direction, or one may sometimes wonder at their calms and materials, while the foot-lights cast shadows upwards on their faces.

The stage rec forms the part latest constructed, and on account of the different changes experienced by it from the 5 th century B.C. until the time of Roman rule, it is the portmost recently in Priene, that have furnished us with well preserved and tangible materials for the architectural structure of the stage buildings and of the proscenion, more that has appeared. But what always buzzes the specialist still is the question of the movable decorations and the place on which [illegible] statements in Vitruvius (Book [illegible]) [illegible] stage and decorative paints

be acoustic cells (Fig. 420), since the number and location correspond to the statements of Vitruvius, and the restoration of the lacking parts may be easily made to satisfy the descriptions of Vitruvius; yet I might recognize in the division walls, cut from a single block, merely the supports of a row of seats, whose form was required by the conditions of the ground, the inclination of the step-seats, and the plan of the diazoma. The statements concerning the discoveries of acoustic chambers etc. in Scythopolis and Lyktos are now termed untrustworthy.

Vitruvius requires three horizontal series of chambers for great theatres, the first for the harmonic scale, the second for the chromatic, and the third for the diatonic scale.

The visual distances for the most distant spectators are no less to be mentioned, since they amount to:--

| | |
|---|---|
| Telmissos | 159.08 ft. |
| Patara | 160.72 ft. |
| Aspendos | 177.12 ft. |

Yet the spectator easily comprises at a glance the orchestra and the stage, the "thymeliker" and the "skeniker" (see Fig. 423); such caricatures as the occupant of the highest row and of the front parterre in our modern theatres, in which the group of players are sometimes viewed in horizontal projection, or one may sometimes wonder at their chins and nostrils, while the foot-lights cast shadows upwards on their faces.

The stage back forms the part latest constructed, and on account of the different changes experienced by it from the 5 th century B.C. until the time of Roman rule, it is the portion of the Grecian theatre most disputed by philologists and architects. By the conclusive discoveries in Epidauros, and most recently in Priene, that have furnished us with well preserved and tangible materials for the architectural structure of the stage building and of the proscenion, more juiet has appeared. But what always busies the specialist still is the question of the moveable decorations and the place on which the actors appeared. Various statements in Vitruvius (Book VII, preface, and VIII,5) on the stage and decorative painter

Aesthetics of Rome (5 th century B.C.), on the theatre pair-
ter Apuleius from alchemy in the Hellenistic time, was in
the "little"treatise at Tarsus had to deal the decorations
with artistic hand, his essays in Book V, 3 and 5 on the con-
struction of the stage walls and their diversity, on the cool-
ness (peristoes), the use of scenery etc. (palace architect-
ure, private buildings and landscapes) bring as little clear-
ness in this matter as the statements of Servius and Polux
thereon, and upon the handling of mechanical arrangements.

Much might indeed be attained, if one were to once abandon
the attempt to not apply the decorations mentioned to the
great stone theatres with the permanent stage, or desire to
conceal this. Vitruvius expressly emphasizes, that Apollodorus
[illegible] in the small "[illegible]" [illegible]
rascene and Tragae" (2 nd Edition). I indicated thereon,
that for the said drama only similarly large buildings, such
as the Theatre Marcellus [illegible], the [illegible]
osta, Nabies, Catania and others were to be considered, and
if man would decide to take the words of Vitruvius (Book V,
2, 3) in earnest:--"Not the Greeks call the stage scaffold
the logeion, therefore since with them only the tragic and
comic drama are played on the stage (orchestra), but the oth-
er artists (thymelicer) appear on the orchestra -- and that
the height of the stage must be not less than 10 ft. nor more
than 12 ft."

Otherwise we must content ourselves with what was said [1] in
an approved doctor's dissertation of the Technische Hochschule
at Hanover:-- "Although a certain obscurity still rests on
its character (i.e. of the scenery) and the mode of its use,
that its clear classification remains and compels us to seek
plausible explanations in the domain of probabeness ---". Yet
until this"certain obscurity"disappears, it has first still a
good distance! And yet the writings of A. Pirrett [2] and W. G.
Hochstein [3] and others have contributed much to simplify the
question, when man finally begin to take into consideration
the actual dimensions of the theatre and alternate reached
convolution, that in great theatres the diacine and movile of
colossal coulisses and curtains (the latter up to 25x5 sq. ft.
area) established very splendid technical requirements, and

Agatharchos of Samos (5 th century B.C.), on the theatre painter Apaturius from alabanda in the Hellenistic time, who in the "little"Treatre at Tralles had to paint the decorations with artistic hand, his essays in Book V, 8 and 9 on the decoraction of the stage walls and their diversity, on the coulisses (periactes), the use of scenery etc. (palace architecture, private buildings and landscapes) bring as little clearness in this matter as the statements of Servius and Pollux thereon, and upon the handling of mechanical arrangements.

Such might indeed be attained, if men were to once abandon the attempt to not apply the decorations mentioned to the great stone theatres with the permanent stage, or desire to compel this. Vitruvius expressly emphasizes, that Apaturius painted for the small Theatre in the "architecture of the Etruscans and Romans" (2 nd Edition). I intimated thereon, that for the said dispute only similarly large buildings, such as the Theatrum tectum in Pompeii, the covered Theatres in Aosta, Naples, Catania and others were to be considered, and if men would decide to take the words of Vitruvius (Book V, 7, 2) in earnest:--"That the Greeks call the stage scaffold the logeion, therefore since with them only the tragic and comic dramas are played on the stage (skeniker), but the other artists (thymeliker) appear on the orchestra -- and that the height of the stage must be not less than 10 ft. nor more than 12 ft."

Otherwise we must content ourselves with what was said [1] in an approved doctor's dissertation of the Technische Hochschule at Hanover:-- "Although a certain obscurity still rests on i its character (i.e. of the scenery) and the mode of its use, that its clear signification restrains and compels us to seek plausible explanations in the domain of hypotheses ---". But until this"certain obscurity"disappears, it has first still a good distance! And yet the writings of A. Streit [2] and of O. Puchstein [3] and others have contributed much to simplify the question, when men finally began to take into consideration the actual dimensions of the theatre and afterwards reached conviction, that in great theatres the placing and moving of colossal coulisses and curtains (the latter up to 3875 sq. ft. area) established very splendid technical requirements, and

the periaktes and of the backcurtain. Thus for the use of a "scene ductilis" (movable stage), as for every Dörpfeld assumes for the colossal theatre in Megalopolis, there is indeed no mention in the Greek theatre of Vitruvius. Fredstein believes that a rolling decorative surface of 113.7 ft. in length and not less than 98.3 ft. high must be raised, "that this is indeed the greatest, that must be exacted from the reader of Dörpfeld-Reisch's work on the Theatre -- and on technical grounds not only opponents but also the supporters of the skenemata in the said book have aroused doubts"! And the position of A. Streit thereon is shown by his excellent and learned [illegible] They have a more drastic and suggestive effect than the [illegible] ive pieces were set up free, drawn out and in and made to vanish [illegible] stating points are leaning to us.

[illegible] building of ancient and modern nations. Vienna. 1888.

[illegible] Berlin. [illegible]

[illegible] Chicago. 1892.

Furthermore still remains the decision for the place of the play, which even extends into the Hellenistic period, as stated, by Dörpfeld and his followers is assumed to be in the orchestra and before the proscenion, under the significant understanding, that scene and heroes must still appear on the proscenion (or its roof). This theory is also not very exclusive!

O. Puchstein and his pupils on the contrary only permit the [illegible] and asserted to be the floor of the playing stage. For this

that these were also objectionable on esthetic and other grounds, but especially also since nothing has become known to us concerning their dimensions in width and height, both of the periactes and of the background. Thus for the use of a "scene ductilis" (moveable stage),as for example Dörpfeld assumes for the colossal Theatre in Megalopolis, there is indeed no mention in the Grecian theatre of Vitruvius. Puchstein believes that a rolling decorative surface of 113.5 ft. in length and not less than 26.2 ft. high must be raised, "that this is indeed the greatest, that must be exacted from the reader of Dörpfeld-Reisch's work on the Theatre -- and on technical grounds not only opponents but also the supporters of the statements in the said book have aroused doubts"! And the position of A. Streit thereon is shown by his excellent and beautifully drawn plates, that he has devoted to this question! They have a more drastic and emancipating effect than the most lengthy comparisons in words. To show how such decorative pieces were set up free, drawn out and in and made to vanish sidewise, stiffened against wind and weather and protected, the possibility unfortunately fails, since the necessary starting points are lacking to us.

*Note 1. See Beiträge zur Bauwissenschaft. Heft. 6. Edited by C. Gurlitt. Berlin. 1906.*

*Note 2. Streit. Das Theater. Investigation on the Theatre building of classical and modenn nations. Vienna. 1903.*

*Note 3. Puchstein, O. Die Griechische Bühne. An esthetic investigation. Berlin. 1901.*

*Note 4. Dörpfeld, W & E. Reinsch. Das Griechische Theater. Athens. 1896.*

Furthermore still remains the decision for the place of the play, which even extends into the Hellenistic period, as stated, by Dörpfeld and his followers is assumed to be in the orchestra and before the proscenion, under the significant understanding, that gods and heroes must still appear on the proscenion (on its roof). This theory is also not very exclusive!

O. Puchstein and his pupils on the contrary only permit the actors on the roof of the proscenion, that by them is assumed and asserted to be the floor of the playing stage. For this

seen your trustworthiness and kindmindedness, when you accor-
ded on the Oxides [1] with the actors, and you looked over such
[illegible]
thout being disturbed in any way". Consequently the man ei-
ther stood like a god on the roof of the proscenion or like
a comedian on the boards of the stage! According to the evi-
dence of Dunion, the bad tragic and comic actors were driven
[illegible]
had to play an insane person, threw himself down from the
stage and sat down below in the midst of the senate before
two men of consular rank.

Note 5. Vanat IV, p. 194 B.

Note 1. The "oxides" was introduced by Sophylus. The word
occurs frequently. Now Hero in Lucian refers the actors in
ascend to the "oxidentes". (Lucian. Hero. Chap. 8, p. 84).

Further information is afforded by the vase paintings, but
[illegible]
ent ones is represented a players' stage, that appears as a
roughly wrought wooden podium. Three or four steps support
a board floor, up to which in certain cases leads a flight
of 4 to 8 steps, (Fig. 488), but not on others. Instead of
posts also occurs white painted stumpy Doric columns. The
[illegible]
umns. Likewise the front wall of the proscenion does not re-
main without correspondation, which consists of suspended fab-
rics, garlands and the like. With the Attician "oblique"
stage may accord the description of a Spanish village stage,
what runs as follows, according to A. Streit:-- "Thus Cervan-
tes says of Lope de Rueda (about 1550 A.D.), who was both po-
et and actor and wandered from place to place; the stage con-
sisted of four benches forming a square, on which were laid
[illegible]
lence area or the ground. To the stage then still belonged
the old woolen curtain, drawn sideways by two cords, behind
[illegible]
ornament of the guitar".

indeed may be mentioned a passage of Plato:-- [5] "Very forgetful must I then be, O Agathon, Socrates said, since I have seen your trustworthiness and highmindedness, when you ascended on the Okibos [1] with the actors, and you looked over such a great multitude of spectators, when you spoke your part without being disturbed in any way". Consequently the man either stood like a god on the roof of the proscenion or like a comedian on the boards of the stage! According to the evidence of Lucian, the bad tragic and comic actors were driven down from the stage and not from the orchestra; an actor, who had to play an insane person, threw himself down from the stage and sat down below in the midst of the senate before two men of consular rank.

*Note 5. Feast 17. p. 194 B.*

*Note 1. The "okibos" was introduced by Eschylus. The word occurs frequently. Now Nero in Lucian permits the actors to ascend to the "okibontes". (Lucian. Nero. Chap. 9, p. 64).*

Further information is afforded by the vase paintings, but only by those on vases from lower Italy. On about 18 different ones is represented a players' stage, that appears as a roughly wrought wooden podium. Three or four posts support a board floor, up to which in certain cases leads a flight of 4 to 8 steps, (Fig. 426), but not on others. Instead of posts also occurs white painted stumpy Doric columns. The drama is played before a background decorated by Ionic columns. Likewise the front wall of the proscenion does not remain without ornamentation, which consists of suspended fabrics, garlands and the like. With the Apulian "phlyake" stage may accord the description of a Spanish village stage., that runs as follows, according to A. Streit:-- "Thus Cervantes says of Lope de Ruada (about 1550 A.D.), who was both poet and actor and wandered from place to place; the stage consisted of four benches forming a square, on which were laid 4 to 6 boards and thus was about 4 hands higher than the audience area or the ground. To the stage then still belonged the old woolen curtain, drawn sidiwise by two cords, behind which stood musicians, that say romances without the accompaniment of the guitar".

played on the stage to the stage".

The problem now is to occupy one's self with the actually existing structures and distorted by no restorations, in order to fall into a rigid decision, such as O. Fendstein expresses against those believing otherwise, when he says:-- "It appears to me that what Ostrotid and Reinow have placed before us in their books are mere conjectures, produced on the ground of entirely different and quite uncertain materials, and then powerfully enforced on the ruins (p. 24): and then he buries

ros two buildings of unequal height, that according to Lugnstein "together form one organic structure", that indeed can-

" that

building of the same extent but with greater depth, the stage structure. For the latter appeared in elevation originally or even in a later time, we know not; but it is hoped in no case as it is represented in the books on theatres by the two

The designation of the low front building by the word "proscenion" is proved by the inscription found in Orchus, also against the designation of the high building by "stage building", i.e., the front is also the scene-wall and pulpit; there is nothing to recall.

The front structure has exits toward the orchestra, the two-story rear building has entrances and exits from the street in the ground story, and others toward the audience room, the terrace roof and to the interior of the proscenion. -- For the proscenion appeared at the time of its erection, we can

"The essential part of the play occurred on the stage, yet as the Chiron vase shows, all sorts of little jests might be played on the steps to the stage".

The problem now is to occupy one's self with the actually existing structures and distorted by no restorations, in order to fall into a rigid decision, such as O. Puchstein expresses against those believing otherwise, when he says:-- "It appears to me that what Dörpfeld and Reisch have placed before us in their books are mere conjectures, produced on the ground of entirely different and quite uncertain materials, and then powerfully enforced on the ruins 6p. 24); and then he hurries to the conclusion;- "What a long chain of mere conjecture and unskilful combinations"!

First the ground plan, where it is premised, that it concerns two buildings of unequal height, that according to Puchstein "together form one organic structure", that indeed cannot be doubted from the architectural standpoint. A low front structure (the proscenion) only 9.7 to 18.1 ft. high, that in extent exceeds but little the diameter of the orchestra a and otherwise has but a small depth. Behind this a two-story building of the same extent but with greater depth, the stage structure. How the latter appeared in elevation originally or even in a later time, we know not; but it is hoped in no case as it is represented in the books on theatres by the two contending authors.(See views of theatres by Dörpfeld and by Puchstein; Figs. 425, 426).

The designation of the low front building by the word "proscenion"is proved by the inscription found in Oropos, also against the designation of the high building by "stage building", i.e., the booth in which the actors remain and prepare, there is nothing to recall.

The front structure has exits toward the orchestra, the two-story rear building has entrances and exits from the street in the ground story, and others toward the audience room, the terrace roof and to the interior of the proscenion. -- How the proscenion appeared at the time of its erection, we can recognize from the architectural parts now partially standing in Epidauros, Oropos and particularly in Priene. Of the upper

are still to be found in place.

It is to be noted here, that C. Puchstein terms Dörpfeld's [illegible] "the stoary rear structure.

As little as the orchestra or the audience room had the same accordant form in all existing theatres, just as little is t this the case for the stage building ("the stoared stage"). In proof of this, let the following theatres be mentioned.

1. That on Delos (See Fuchstein, p. 3[illegible]), where a rectangular plan of the stage 47.5 ft. long and without dividers, accessible outward by a doorway from the rear, was the basis. Three doorways on the facade wall were assumed. How the interior was covered and where it received light is unknown. The front wall ("ornamented wall") of the proscenion consisted of square piers and projecting half columns, while the three free sides of the stage building were surrounded by [illegible] (Fig. 4[illegible]). [illegible] latter, balustrades or walls must have extended around in [illegible] to those in the ground story. There is assumed the detached stage building with peripteral pier and column porticos in the ground story, which supported a terrace roof. The entrance front angle pier of the portico.

2. In Priene the stage building consisted of three rooms lying beside each other and about 8.2 ft. high, that red doorways toward the proscenion, but only one main entrance doorway from the street. Daylight entered these rooms through several slits in the external walls, 5.9 to 7.9 ins. wide. What was completed on Delos is but partially executed in Priene, where only the front portico with a row of piers with attached half [illegible] one of such is assumed at the end. The entrances to the orchestra are arranged in the same manner as for (1); the height [illegible] above the height of the proscenion formed by the front portico.

story of the stage building in Oropos there are only scattered remains found, but in Priene several courses of ashlars a are still to be found in place.

It is to be noted here, that O. Puchstein terms Dörpfeld's proscenion a logeion; both employ the word "stage" for the two-story rear structure.

As little as the orchestra or the audience room had the same accordant form in all existing theatres, just as little is t this the case for the stage building ("the stepped stage"). In proof of this, let the following theatres be mentioned.

1. That on Delos (See Puchstein, p. 54), where a rectangular plan of the stage 47.5 ft. long and without divisions, accessible outward by a doorway from the rear, was the basis. Three doorways on the facade wall were assumed. How the interior was covered and where it received light is unknown. The front wall ("ornamented wall") of the proscenion consisted of square piers and projecting half columns, while the three free sides of the stage building were surrounded by porticos on piers.(Plan, Fig. 427). Corresponding to the latter, balustrades or walls must have extended around in the upper story, where the doors were arranged to correspond to those in the ground story. There is assumed the detached stage building with peripteral pier and column porticos in the ground story, which supported a terrace roof. The entrance doorway toward the orchestra had the jambs adjoining the front angle pier of the portico.

2. In Priene the stage building consisted of three rooms lying beside each other and about 8.2 ft. high, that had doorways toward the prosgenion, but only one main entrance doorway from the street. Daylight entered these rooms through several slits in the external walls, 5.9 to 7.9 ins. wide. What was completed on Delos is but partially executed in Priene, where only the front portico with a row of piers with attached half columns were finished, by which only for two intercolumniations of such is assumed at the end. The entrancesto the orchestra are arranged in the same manner as for (1); the height of the jamb (doorway pier) is fixed at 12.2 ft., thus rising above the height of the proscenion formed by the front portico,

whose length of 10.4 ft. corresponds to the diameter of the tonal circle. The three openings in the front wall and on the rear side of the stage building are each 5.2 ft. wide and 6.6 ft. high, thus corresponding in dimensions to about our modern normal single doorways. Of the upper story walls built of sandstone, there yet stand three courses with a total height of 8.8 ft. at the western end and also four courses at the right jamb of the doorway, which led to the upper hall.

3. At the Theatre in Assos, the continuation of the portico at the ends is omitted. The prefixed row of piers with half columns only extends as an "ornamental wall" of the proscenium, projecting but little at front and left beyond the stage building, that consists of three adjacent rooms, connected together by doors and only accessible from the front by three separate doorways. The piers of the parodoi doorways adjoined at right angles the angle piers of the front proscenium wall. (Plan; Fig. 4?5).

4. If the ever-colonnade at the proscenium of the said Theatre and also that in Orange (plan, Fig. 415) always constructed in one plane, we see this abandoned in Epidauros, where at both ends are arranged projections of 3.35 and 5.55 ft. wide and the columns facade terminates, which indeed appears to possess only from aesthetic feeling and not from a technical necessity; they have no purpose.

No starting points were found for a definite limiting of the great proscenium interior, where the contrary is not expressly stated.

Passing to the superstructure, there are first to be considered the theatres in Epidauros, Orange and Priene. It is certain for the proscenium in Epidauros, and it consists of a marble front wall, adorned by 12 Ionic half columns, while the projections at the front corners are ornamented by three-quarter columns with quarter columns at the recurrent angles on square piers. The columns bear the conventional Ionic entablature, consisting of the architrave, plain frieze and cornice, that is broken around the projection. The panels between the column-axes measure in the clear 3.94 × .55 ft., thus being little larger than are normal doors to living rooms.

whose length of 60.4 ft. corresponds to the diameter of the basal circle. The three openings in the front wall and on the rear side of the stage building are each 3.47 ft. wide and 6.6 ft. high, thus corresponding in dimensions to about our modern normal single doorways. Of the upper story walls built of ashlars, there yet stand three courses with a total height of 3.6 ft. at the western end and also four courses at the right jamb of the doorway, which led to the upper hall.

3. At the Theatre in Assos, the continuation of the porticos at the ends is omitted. The prefixed row of piers with half columns only extends as an "ornamental wall"of the proscenion, projecting but little at right and left beyond the stage building, that consists of three adjacent rooms, connected together by doors and only accessible from the front by three separate doorways. The piers of the paradoi doorways adjoined at right angles the angle piers of the front proscenion wall. (Plan; Fig. 428).

4. Ifthe pier-colonnade at the proscenion of the said Theatre and also that in Oropos (plan, Fig. 415) always constructed in one plane, we see this abandoned in Epidauros, where at both ends are arranged projections of 3.28 and 6.56 ft. w wide and the columnar facade terminates, which indeed appears to proceed only from esthetic feeling and not from a technical necessity; they have no purpose.

No starting points were found for a daylight lighting of t the great proscenion interior, where the contrary is not expressly stated.

Passing to the superstructure, there are first to be considered the theatres in Epidauros, Oropos and Priene. It is certain for the proscenion in Epidauros, and it consists of a m marble front wall, adorned by 12 Ionic half columns, while t the projections at the front corners are ornamented by three-quarter columns with quarter columns at the reentrant angles on square piers. The columns bear the conventional Ionic entablature, consisting of the architrave, plain frieze and dentil cornice, that is broken around the projection. The panels between the column-piers measure in the clear 3.94 × .85 ft., thus being little larger than are normal doors to living rooms.

The elevation from the plinth to the top of the cornice is 11.6 ft. high. What stood behind this is only preserved in a few ashlar courses of the structure. [1]

*Note 1. Kabbadias, P. Epidauros. Athens 1900. Pl. 72, and the same in Praktika. Athens. 1906.*

6. In Oropos is determined the same marble wall, but which is only 8.2 ft. high to the top of the cornice. The eight half columns, the two angle piers and the entablature are of the Doric order (Fig. 415); the openings between the supports are 8.46 × 6.56 ft., thus being somewhat smaller than those at Epidauros. The walls of the stage are built of poros ashlars and still stand upright to 6.56 ft. Columns and entablature of the proscenion are made of white marble and still stood at the excavation. They were later maliciously overthrown and thus were partially broken in fragments. [2]

*Note 2. See Dörpfeld, W. & E- reinsch. Das Griechische Theater. p. 102. Athens. 1896.*

On the architrave over the colonnade stands the inscription&- "Agonotheas to proscenion kai tous pin(akas", by which this wall was designated as the proscenion. For the assumption, that this was the rear wall for the actors, the small height indeed remains conceivable; but the diameter of the orchestra here amounts to only 40.6 ft. to the outer edge of the ring, while it measures 78.7 ft. in Epidauros, and the playing floor would be only 8.92 ft. wide for a logeion, if the stage were carried high.

Furthermore, neither in Epidauros nor in Oropos was the depth of the logeion made according to the rule of Vitruvius; in both cases it must have been executed according to thb sketches in Fig. 429.

Of a further dedicatory inscription on a Doric architrave with peculiar ends like consoles, there were three fragments found, that must have belonged to the stage, [1] whose height above the proscenion could no longer be determined, wherefore the attempt at restoration lacks an assured basis. The two console-like blocks of the architrave permit Dörpfeld to assume an opening in the upper story of the stage and toward the audience room, from which one could step out on the roof of

[illegible] circular form of the opening, the author of the sketch reals[illegible] [illegible] — and [illegible] [illegible] [illegible] [illegible] [illegible] and associatly rode to fly through this "circular opening", [illegible] explaining: "If the opens (on which the god was fastened) was somewhat lowered, then the person sank (stretched out horizontally ?) down to the roof of the proscenion (it was not much to sink with the opening assumed at 9.25 ft. high, if one assumes that the person came on his legs and not on his belly), and standing on the bottom, he could speak to the actors and spectators below." (Thus in the orchestra). Since the gods were also colleagues to the artists, then will the terrace roof be conceded, in its signification as a logeion. This is yet further developed:-- "Likewise one conceives, that it was such (in this free length) to the beam over the opening (that [illegible] should be borne by the curved architraves (where they are [illegible]

Note 1. See Dörpfeld, W & E. Heliaeon. p. 102, 104.

For the form shown is to be treated rather a breaking of the consoles, then that one should count on their aid to receive the load. [2]

Note 2. Balcony supports and corbels for door and window lintels, as then are-taken to be independent members in stone-cutting. In setting them, as a rule care is taken to protect the end of the beam from any pressure, that as one also seems to protect the edges of the corners of the capital from any load by the abacklum. The widely projecting and cant-like capital of the early Doric style certainly did not aid in preserving the [illegible]

For the restored view of the stage at Cropos (Fig. 42 in his work), one will therefore only hold its author responsible.

[illegible] At the [illegible] supports of the front wall of the proscenion still stand [illegible] right; 12 in front, 2 on the east and 1 on the west sides.

the proscenion. But this does not explain the great width and singular form of the opening, the author of the sketch restoration states, -- but still he alone has discovered the "singular form and the opening"! Then he permits soaring persons and especially gods to fly through this "singular opening", discovered by himself, on to the roof of the proscenion, thus explaining; "If the crane (on which the god was fastened) was somewhat lowered, then the person sank (stretched out horizontally ?) down to the roof of the proscenion (it was not much to sink with the opening assumed at 9.85 ft. high, if one assumes that the person came on his legs and not on his belly), and standing on the podium, he could speak to the actors and spectators below." (Thus in the orchestra). Since the gods were also colleagues to the artists, then will the terrace r roof be conceded, in its signification as a logeion. This is yet further developed:-- "Likewise one conceives, that it was technically necessary or at least useful to give a smaller span (in this free length) to the beam over the opening (that is here a part of the triglyph frieze) and the crane, that s should be borne by the curved architraves (where then are such -- or are meant by this the console-like corbel blocks?).

*Note 1. See Döppfeld, W & E. Reinsch. p. 102, 108.*

For the form shown is to be freared rather a breaking of t the consoles, than that one should count on their aid to receive the load. [2]

*Note 2. Balcony supports and corbels for door and window lintels, as they are taken to be independent members in stonecutting. In setting them, as a rule care is taken to protect the end of the beam from any pressure, just as one also seems to protect the edges of the abacus of the capital from any l load by the scamillum. The widely projecting and disk-like capital of the early Doric style certainly did not aid in reducing the "clear span" of the architrave !)*

For the restored view of the stage at Oropos (Fig. 42 in h his work), one will therefore only hold its author responsible.

6. At the Theatre in Priene, entirely built of marble, all supports of the front wall of the proscenion still stand upright; 12 in front, 2 on the east and 1 on the west sides.

the three at the ends being square piers.(Fig. 4EU). Only a
pine capitals are wanting, but instead there is still in the
[illegible] [illegible] [illegible]
numbered piers with the half columns of the same form known
in Assos and Oropos. Under each fourth triglyph is found a
support. The total height of the proscenion amounts to 8.8
ft., thus again being about 0.66 ft. greater than that of Oropos.

The mass of the detail forms of the entablature are designed in the splendid publication of the Royal Museum at Berlin as "varying considerably", while this measures but 6.55 ft. The cornice blocks measure 8.06 to 8.75 ft. ft. in the thick-
[illegible]

[illegible]
of archaeological research and for the history of architecture.

But not only are the detail forms produced by the showcase-ing well preserved, but their painting can still be determined. The capitals and shafts of the columns were purple-red, as a
[illegible]
blue, the mutules were colorless (white), the mutules were b
lue, and the viae and cornice red, the various egg-and-dart moulding being blue and red.(See p. 87 of the work). Therefore the entire superstructure is assured in its forms and i
ts content, as well as the decorny items at the parade (see the distant photograph, Fig. 2EV, in the work) and also the rear wall of the proscenion or the front wall of the stage -- as one prefers -- with its three doorways, while the upper story of the latter only remains in a few subsur courses, of which the editors of the said publication say, that they can state nothing certain in regard to the architectural treat-ment. The Roman remnline of the theatre is of no importance here. Free play is here left to the imagination, and it has made use of its right. At the two ends of the proscenion

Ten of the front supports are formed as piers with attached half columns of the Doric order, the two angle supports and the three at the ends being square piers.(Fig. 430). Only n nine capitals are wanting, but instead there is still in the eastern third the entire Doric entablature, resting on the uninjured piers with the half columns of the same form known in Assos and Oropos. Under each fourth triglyph is found a support. The total height of the proscenion amounts to 8.9 ft., thus again being about 0.65 ft. greater than that of Oropos.

The mass of the detail forms of the entablature are designated in the splendid publication of the Royal Museum at Berlin as "varying considerably", while this measures but 6.56 ft. The cornice blocks measure 6.05 to 6.26 ft. ft. in the thickness of the wall, which does not here come into consideration, either technically or esthetically.1

*Note 1. Priene. Ergebnisse der Ausgrabungen und Untersuchingen in den Jahren 1895-1898 von Th. Wiegand und H. Schrader. Berlin. 1904.-- A solid and model publication in the domains of archaeological research and for the history of architecture.*

But not only are the detail forms produced by the stonecutter well preserved, but their painting can still be determined. The capitals and shafts of the columns were purple-red, as w well as the taenia of the architrave, the triglyphs were light blue, the metopes were colorless (white), the mutules were b blue, and the vias and cornice red, the various egg-and-dart mouldings being blue and red.(See p. 247 of the work). Therefore the entire superstructure is assured in its forms and i its extent, as well as the doorway jambs at the paradoi (see the distant photograph, Fig. 227, in the work) and also the rear wall of the proscenion or the front wall of the stage -- as one prefers -- with its three doorways, while the upper story of the latter only remains in a few ashlar courses, of which the editors of the said publication say, that they can state nothing certain in regard to the architectural treatment. The Roman rebuilding of the theatre is of no importance here. Free play is here left to the imagination, and it has made use of its right. At the two ends of the proscenion

still remains in place and is remarkably distinctive around in thickness, (0.75 ft. at bottom and 0.88 at top, and 2.11 ft. in length (fig. 483)).

The balustrade standing outside (W) is terminated at the upper edge by a band 2 ins. wide and projecting 0.75 in., the inner side being thicker at the front, like an arch.

The former existence of a similar slab on the eastern side

rises in turn, excluding all doubt, "a low side balustrade", which is so far interesting, since thereby a way to the roof of the prosperion is closed at both ends, and such would be only possible, either by a doorway in the front wall of the stage, or by the intervals between the angles of the stage and the said balustrade. Puchstein (p. 80, 83) says on the contrary, "that these marble slabs might form the base of a mid wall, which enclosed the stage at the right and left to the top, analogous to the known "varanes", so far concerning

one protest the contrary (note on p. 880) and state, "that not without the strongest technical objections could one advise the acceptance of side walls and sad therefor:-- how then could a single pier in the lower story support the load of a two-story (pro!) wall?" If this were the only ground for objection, then might one be quiet, for in the first place, there can be no question of a two-story wall, and secondly, if its weight is transferred to two rectangular piers (2.15 × 1.34 and 1.46 × 1.46 ft.), so far as one can measure, that = 2.14 sq. ft. in cross section. The walls in question were 9.35 ft. long, required no greater height than 12.7 ft., having the given thickness of 0.82 ft. That may be constructed without technical objections, if one only takes care that the stones spanning the piers be so arranged and dimensioned, that they do not break -- and that is possible, since they have clear spans of but 7.8 ft., while without any special the architrave at the middle intercolumniation of the Propylaion in Athens has a free span of about 19.7 ft. and has to

roof, 9.0 ft. deep, according to Puchstein being the floor of the stage, were marble balustrades 3.05 ft. high, one of which still remains in place and is remarkably diminished upward in thickness. (0.75 ft. at bottom and 0.65 at top, and 3.11 ft. in length (Fig. 430)).

The balustrade standing outside (W) is terminated at the upper edge by a band 2 ins. wide and projecting 0.79 in., the inner side being thicker at the front, like an ante.

The former existence of a similar slab on the eastern side is ensured by dowells and marks of setting. The editor recognizes in this, excluding all doubt, "a low side balustrade", which is so far interesting, since thereby a way to the roof of the proscenion is closed at both ends, and such would be only possible, either by a doorway in the front wall of the stage, or by the intervals between the angles of the stage a and the said balustrade. Puchstein (p. 50, 52) says on the contrary, "that these marble slabs might form the base of a high wall, which enclosed the stage at the right and left to the top, analagous to the Roman "versures", so far completing the parascenion at each side." The authors of the work on Priene protest the contrary (note on p. 250) and state, "that not without the strongest technical objections could one advise the acceptance of side walls and add thereto:-- how then could a single pier in the lower story support the load of a two-story (sic !) wall?" If this were the only ground for objection, then might one be quiet, for in the first place, there can be no mention of a two-story wall, and secondly, i its weight is transferred to two rectangular piers (2.18 × 1.64 and 1.48 × 1.48 ft.), so far as one can measure, that = 2.18 sq. ft. in cross section. The walls in question were 9.85 ft. long, required no greater height than 19.7 ft., having the given thickness of 0.82 ft. That may be constructed without technical objections, if one only takes care that the stones spanning the piers be so arranged and dimensioned, that they do not break -- and that is possible, since they h have clear spans of but 7.3 ft., while without any special the architrave at the middle intercolumniation of the Propyleion in Athens has a free span of about 19.7 ft. and has to

| | |
|---|---|
| Corinth | c d = 1 1/2 times a b. |
| Priene | c d = 1 1/8 times a b. |
| Magnesia, Doric | c d = 1 1/2 times a b. |
| Delphi, Doric | c d = a b. |

| | |
|---|---|
| Temple Zeus, Olympia | c d = 2 times a b. |
| Eleusis | c d = 2 times a b. |
| Sounion | c d = 2 times a b. |
| Paestum | c d = 2 times a b. |

carry an entirely different load.(Also see the cross beams of the north portico of the Erechtheion with 19.7 ft. free span). The wall has a volume of 159.0 cu ft. with a weight of 24,800 lbs. (156 lbs. per cu. ft.), so that a sq. in. of the section of the pier, and as an average, was only loaded with 64 lbs! Yet where there is nothing, the emperor has lost his rights, and so may the two assumptions remain for a time.

On account of the destruction of the stage of the Theatre in Magnesia-a-M., we are relieved from every need of being compelled to take part for or against the views of Dörpfeld and of Puchstein. The editors of the likewise excellent work on Magnesia [1] say (p. 23, note 1):-- "As for the restorations of the stage building proposed by Dopfeld and by Puchstein it is to be remembered, that the ruins afford no sufficient basis for them. The stage structure is destroyed, excepting some few remains of the foundation walls, but they show five rooms beside each other".

*Note 1. Berichte über die Ergebnisse der Ausgrabungen der Jahren 1891-1893 von Carl Humann. Berlin. 1904.*

Concerning the spacing of the piers with columns, it may be further mentioned, that this in nowise corresponds to the sc scheme of the great temple architecture of the Doric and Ionic styles, but are rather similar to the arrangement of the columns in the public porticos. For the theatres in question are given the following numerical ratios.(See sketch, Fig. 481).

| | |
|---|---|
| Epidauros | c d = 1 1/2 times a b. |
| Oropos | c d = 1 1/2 times a b. |
| Priene | c d = 1 1/8 times a b. |
| Delos, portico | c d = 1 1/2 times a b. |
| Magnesia, portico | c d = 1 1/2 times a b. |
| Delphi, portico | c d = a b. |

While for the different temples are given the following approximate ratios:--

| | |
|---|---|
| Parthenon, Athens | c d = 2 1/2 times a b. |
| Temple Zeus, Olympia | c d = 2 times a b. |
| Egina | c d = 2 times a b. |
| Selinus | c d = 2 times a b. |
| Paestum | c d = 2 times a b. |

| | |
|---|---|
| Corinth | c d = 1 4/5 a b. |
| Arrangeion in Magnesia | c d = 3 1/3 a b. |
| Temple Zeus, Stratonicia | c d = 3 a b. |
| Temple Zeus, Aizanoi | c d = 3 a b. |
| Treasuries, north portico | c d = 2 1/2 a b. |

[illegible] surely small in relation to the other proportions, being 4.45 ft. in Corfu, 5.74 in Epidauros and 6.91 in Priene. On the other hand, the cross section of the stone supports is very [illegible] the given stone material could one build higher, were it not that the form would play the chief part for this architectural portion.

Another important question is:-- were the openings of the intercolumniations open or closed, and in the latter case, how they could be closed partly by movable doors, -- a middle and two side doors -- partly by special items or panels, termed "pinakes". Marks of arrangements for fastening frequently appear on the piers, by means of which the proof may be produced, that such closing panels were in use. That at a certain time the stage and the proscenion were entirely constructed of wood, before men proceeded to execute them in stone, must be believed, but is here scarcely of importance. According to the evidence of inscriptions, the wooden proscenion on Delos disappeared in 355 B.C. The manner of the completion of the change, how wooden posts become stone piers and ceiling beams were architraves, the framed panels become closing panels, requires further thought; all that was already inverted! Also self-evident conclusions require no profound expressions. According to C. Fuchstein, W. Dörpfeld should have recognized in an "acute"way, that the said panels closures were always of wood in the Greeian period, even when the other parts of the stage were constructed of stone. For doors, i.e., for doorways, wood was indeed also employed for the closure in a majority, even when the door jambs were made of stone. If by "pinakes"are to be understood thin wooden walls in the intercolumniations, to be set in place or removed, or if one wishes to assume in their place movable triangular prisms with

| | |
|---|---|
| Corinth | c d = 1 4/5 a b. |
| Artemeseion in Magnesia | c d = 3 1/3 a b. |
| Temple Zeus, Sisipolis | c d = 3 a b. |
| Temple Zeus, Aizaini | c d = 3 a b. |
| Erectheion, north portico | c d = 3 1/6 a b. |

Therefore the actual length of the architrave remains relatively small in relation to the other proportions, being 4.48 ft. in Oropos, 5.74 in Epidauros and 5.91 in Priene. On the other hand, the cross section of the stone supports is very liberally dimensioned for what they have to support. With t the given stone material could one build lighter, were it not that the form would play the chief part for this architectural portion.

Another important question is:-- were the openings of the intercolumniations open or closed, and in the latter case, how? They could be closed partly by movable doors, -- a middle and two side doors -- partly by special forms or panels, termed "pinakes". Marks of arrangements for fastening frequently appear on the piers, by means of which the proof may be produced, that such closing panels were in use. That at a certain time the stage and the proscenion were entirely constructed of wood, before men proceeded to execute them in stone, must be believed, but is here scarcely of importance. According to the evidence of inscriptions, the wooden proscenion on Delos disappeared in 269 B.C. The manner of the completion of the change, how wodden posts became stone piers and ceiling beams were architraves, the framed panels became closing panels, requires further thought; all that was already invented!

And self-evident conclusions require no profound expressions.

According to O. Puchstein, W. Dörpfeld should have recognized in an "acute" way, that the said paneled closures were always of wood in the Grecian period, even when the other parts of the stage were constructed of stone. For doors, i.e., for doorways, wood was indeed also employed for the closure in a antiquity, even when the door jambs were made of stone. If by "pinakes" are to be understood thin wooden walls in the intercolumniations, to be set in place or removed, or if one wishes to assume in their place movable triangular prisms with

not proved. The grooves in the stone supports strengthens
not tell of what kind.

certainly the former pinakes by the grooves in the piers, and
they say that in all intercolumniations, with the exception
of those lying opposite the three doorways of the stage, such
been replaced by "thin mortar walls", as the traces of mortar
on the piers indicate. In the most western front intercolum-
niation has been preserved such a masonry pinakis to a height
of 1.64 ft., which is black-white-red colors on a yellow gro-
und exhibits a painted double door, which is proved by three
plain vertical stripes extending to the ground. [1] In any case
rob consisted of three wooden doors and eight painted on the
pilasters between purple-red columns! Why these fragmentary
own. Might they not be just as well indications of a balus-
trade or of something else?

Note 1. See representation on page 255 of the work for an
incorrectly shown architectural enclosure of the proscenion,
but 8.9 ft. Where scales beneath the figures are necessary,
they are omitted; the such incorrect ones are superfluous.

In a related dissertation [2] edited by O. Smith, it is pre-
ferred to fill the intercolumniations with decorative pictures
instead of doors, which according to need stood before a tra-
gic or comic stage, and were changed according to the corres-
ponding scheme. This was made possible by portices, covered
galleries or by windows, trees, mountains and caves.(Fig. 482).

Note 2. Beiträge zur Bauwissenschaft. Heft VII. p. 51. Ber-
lin. 1906.

as large as the double doors of a modern living room, would
may be left undecided.

painted decorations, then is this permitted to any one, but not proved. The grooves in the stone supports strengthens the opinion that closing panels were there inserted, but do not tell of what kind.

The editors of the work on Priene desire to determine with certainty the former pinakes by the grooves in the piers, and they say that in all intercolumniations, with the exception of those lying opposite the three doorways of the stage, such existed. Excepting the doorways, these pinakes may later have been replaced by "thin mortar walls", as the traces of mortar on the piers indicate. In the"most western"front intercolumniation has been preserved such a masonry pinake to a height of 1.64 ft., which in black-white-red colors on a yellow ground exhibits a painted double door, which is proved by three plain vertical stripes extending to the ground. [1] In any case an ingenious piece of decoration on an "ornamental wall", which consisted of three wooden doors and eight painted on the plastering between purple-red columns! Why these fragmentary strokes of the brush must correctly indicate doors is not shown. Might they not be just as well indications of a balustrade or of something else?

*Note 1. See representation on page 255 of the work for an incorrectly shown architectural enclosure of the proscenion, which is there drawn 11.5 ft. high, while it actually measures but 8.9 ft. Where scales beneath the figures are necessary, they are omitted; the said incorrect ones are superfluous.*

In a related dissertation [2] edited by C. Gurlitt, it is preferred to fill the intercolumniations with decorative pictures instead of doors, which according to need stood before a tragic or comic stage, and were changed according to the corresponding scheme. This was made possible by porticos, coursed ashlars or by windows, trees, mountains and caves.(Fig. 482).

*Note 2. Beiträge zur Bauwissenschaft. Heft VIII p. 51. Berlin. 1906.*

Whether these decorations were less than the natural size, as large as the double doors of a modern living room, would have been very effective in the wide interior of the theatre, may be left undecided.

To now assume that the intercolumniation was filled with joinery -- with painted masonry in mortar, or with rotators, and that the proscenion had a tight roof, it must be asked f for what purpose the rooms under the said roof and behind the ornamental wall were intended? First indeed as an anteroom for the actors awaiting their cues (if the play occurred before the ornamental wall), since their dressing and decoration indeed took place in the ground story rooms of the stage building, lighted by some holes in the walls. But those also had to receive the mechanical arrangements, that were necessary for the vanishing and appearance of personages. Yet the people must still see somewhat at their part, i.e., have light and indeed daylight from outside. If the intercolumniations were closed by boards nailed on or by plastered walls, this would have been ended; so much the more since from the stage building behind light could only sparingly enter the front building. But perhaps this would also be sufficient for the eyes of the natives of the south, in the intense sunshine of the south. Also perhaps not, for otherwise would the front walls of the Roman-Grecian Theatre at Aspendos, Termessos and Sagalossos have been furnished with windows.! [1] In Aspendos are 5 openings , each 3.61 ft. high, in Sagalossos 3.61 ft. high and semicircular at top, that could not alternate with doors, but which would have had little sense at the transformation of the stage. On account of the small height of the podium and not to recall the echo of a wooden architecture, alread: vanished 400 years earlier, were columns scorned for the decoration of the front wall, for which was assumed in Athens a very effective figure frieze.

A. Streit prefers the assumption of transparent decorations in the intercolumniations, painted on cloth, that at least made possible the advantages of easy changes and transmission of light into the machinery room or the waiting room. To leave the doors open during the play, the openings for the pinakes closed by a parapet wall 1.64 ft. high (analagous to the remains at Priene), with a free view through all openings to a continuous painted background, as for example in a certainly somewhat different form -- not in conception but in execution,--

Italian carried out in his Theatre Olympico at Vicenza.[2] It appears to me most acceptable, both technically and aesthetically. It would likewise permit combination with many Pompeian theatre scenarios: mechanical scenery was placed behind the portable movable backgrounds, that were suspended at a distance of about 2.25 ft. behind the rear of the front wall of the proscenium, so that the actors could still pass behind them.

Note 1. See 2. Lanciarenscati, 3. Vignola & B. Peterson, Scaite Teatrali Italiane and Pistoiese. 11. Pia, 18, 19, 20. Vignola.

[illegible] and Theatre in Italy.

[illegible]

ing 8.25 ft. wide directly between the columns then ranks. But in particular and complex cases one must place some accordine to the judgment of the manager. And when as now most one of these genuinely have arranged the scenery better than another. The traces found on the arrangements for placing t the clamps therefore need not be neglected, for during the time that no play occurred, the openings could have been retained for various other reasons.

Towards the stone proscenium, during the play and also between this, was furnished with a permanent ceiling or roof. Grooves and other traces, for example in the courses of the still remaining stones, indicate a ceiling of wooden beams with a board covering. If the beams lay parallel to the front wall, they must have found further bearings on girders, if t they lay perpendicular to the front wall, then girders were superfluous, for they were supported at one side on the stone corresponding wall, and the other on the stone wall of the stage building. For the small depth of the proscenium with a distance between centres of 2.46 to 2.95 ft., the beams received a cross section of 5.9 × 7.1 ins. and a thickness of 1.95 to 1.97 ins. for the board floor.

Ferdeld-Reisch state in summary of Crooms -- "The ceiling of the proscenium, according to the holes remaining behind the cornice blocks, consisted of wood and was horizontal. It formed a cornum, but that was not directly connected with the crossetes, which one could enter without ascending from the

Palladio carried out in his Theatre Olympico at Vicenza, [2] appears to me most acceptable, both technically and artistically. It would likewise permit combination with many Pompeian theatre sceneries! Mechanical apparatus was placed behind the painted movable backgrounds, that were suspended at a distance of about 3.28 ft. behind the rear of the front wall of the proscenion, so that the actors could still pass before them.

*Note 1. See C. Lanckaroronski, G. Niemann & E. Petersen. Städte Pamphyliens und Pisidiens. II. Pls. 13, 18, 19. Vienna. 1896.*

*Note 2. See Streit, A. Plate VIII.*

The rotating, naive, puppet-show decorations placed in strips 3.28 ft. wide directly between the columns then vanish. But in particular and complex cases one must place some according to the judgement of the manager. And then as now would one of these gentlemen have arranged the scenery better than another. The traces found on the arrangements for closing t the pinakes therefore need not be neglected, for during the time that no play occurred, the openings would have been kept closed for various other reasons.

Likewise the stone proscenion, during the play and also besides this, was furnished with a permanent ceiling or roof. Grooves and other traces, for example in the courses of the still remaining stones, indicate a ceiling of wooden beams with a board covering. If the beams lay parallel to the front wall, they must have found further bearings on girders, if t they lay perpendicular to the front wall, then girders were superfluous, for they were supported at one side on the stone ornamental wall, and the other on the stone wall of the stage building. For the small depth of the proscenion with a distance between centres of 2.46 to 3.28 ft., the beams required a cross section of 5.9 × 7.1 ins. and a thickness of 1.58 to 1.97 ins. for the board floor.

Dörpfeld-Reisch state in speaking of Oropos:-- "The ceiling of the proscenion, according to the holes remaining behind the cornice blocks, consisted of wood and was horizontal. It formed a podium, but that was not directly connected with the orchestra, which one could enter without ascending from the

[illegible]

If Sahara we still have tangible evidence. Corresponding to the three well supports, there extended merely beyond the possession wall to the stage building, that on one side were based on the aspiers of the triclyon frieze, and on the other rested on an angular course 1.00 ft. high of the stage building.

The stone gildere were 1.01 ft. wide and 0.56 to 0.58 ft. thick, and they are arranged on two sides for centrees 8.56 ft. wide, on the outer surface being cut roughly out, so that this rises about 1.50 in. above the top of the cornice. The wooden beams on the sides that lay parallel to the proscenium wall and with about 5.55 ft. clear span. Their cross sections were made small for a distance of 1.57 to 2.40 ft. between centres. Since the boards must extend over the roofs tops of the [illegible], then the floor came to lie higher than the front edge of the cornice and special arrangements were required. Whether the floor was then inclined from [illegible] lower be determined, but it is probable. If no [illegible] supports or decorative cells in the substructure were to be erected, then merely the floor boards be laid down only when in use, then being again removed and stored away. The association of a covement or even the addition of a tile roof in the manner of the houses, that the proscenium should remain. With 5.5 to 10.1 ft. high, appears to be excluded. The arrangement of trees on the roofs floor, if these could be proved, would certainly require the wooden or road floor.

For modern the ceiling is the stage floor, the loderon or [illegible] "Corpiede" pretens to designate it as a roof, inasmuch as the flat roof of the houses represented by the proscenion, and Bruhn concludes that the flat roof imitated a tile roof after the reality". To act on this was no clearing impossibility, even for Rome, but was still less acceptable for ordinary mortals. That is the "contested portion" which men will not agree.

Perhaps once wrote to the professor of philosophy Bertrand in Kant:- "No conversant of mannre easily convinces himself, than no one is convinced by the reasons of his opponent. All arguments are merely variations of a first fixed opinion, on

paradoi".

In Priene we still have tangible evidence. Corresponding to the front wall supports, there extended marble beams from the proscenion wall to the stage building, that on one side were bedded on the ashlars of the triglyph frieze, and on the other rested on an ashlar course 1.00 ft. high of the stage building.

The stone girders were 1.61 ft. wide .nd 0.89 to 0.99 ft. high, and they are arranged on two sides for bearings 2.36 ft. wide, on the upper surface being but roughly cut, so that this rises about 1.58 in. above the top of the cornice. The wooden beams on the girders thus lay parallel to the proscenion wall and with about 5.25 ft. clear span. Their cross sections were made small for a distance of 1.97 to 2.30 ft. between centres. Since the boards must extend over the rough tops of the girders, then the floor came to lie higher than the front edge of the cornice and special arrangements were required. Whether the floor was then inclined forward can no longer be determined, but it is probable. If no mechanical apparatus or decorative parts in the substructure were to be protected, then might the floor sometimes be laid down only when in use, then being again removed and stored away. The application of a pavement or even the addition of a tile roof in the manner of the houses, that the proscenion should represent, still 9.8 to 13.1 ft. high, appears to be excluded. The arrangement of traps on the rough floor, if these could be proved, would certainly require the wooden or board floor.

For Puchstein the ceiling is the stage floor, the logeion or pulpitum; "Dörpfeld prefers to designate it as a roof, indeed as the flat roof of the houses represented by the proscenion, and Reisch concludes that the flat roof imitated a tile roof after the reality". To act on this was no pleasing imputation, even for gods, but was still less acceptable for ordinary mortals. That is the "contested point"on which men will not agree.

Goethe once wrote to the professor of philosophy Bachmann in Jena:-- "The connoisseur of mankind should convince himself, that no one is convinced by the reasons of his opponent. All arguments are merely variations of a first fixed opinion, on

who observe your principles.

And now in conclusion:-- since gods, i.e., men temperaments seem, were not always let down from the window of an upper story on the roof by means of a crane, and also orators could not be brought before the people in this way, there must a particular method be laid open for them. And this may be determined from the parts. The roof of the proscenion or the floor of the logeion could be reached by ramps or stairs. In tragedies are arranged beside the parados two doorways, one of which led to a road and the other into the orchestra. Gods and men thus did not come into collision with each other; both had separate ways for the former to reach the upper stage, for the latter to appear on the sidewalk before the house. So much is given by the reality!

This purpose was otherwise attained by a stairway, as may still be seen at the Theatre in Priene. A stairway with 13 steps is arranged at the end of the stage building, and of which 6 steps are still preserved, leads to the roof of the proscenion. And according to the words of the editor of the cited work on Priene (p. 249), there were not in the original plan. "The designer to add the stairway was mentioned during the construction, which one may see on the unevenness of the proscenion, and also that the doorways in the upper story were not later additions. They were projected, when men were [illegible]

In Cosos and Pergamo the orchestra was more so nearly, "that the pavement of the parados at its outer beginning was level with the floor of the upper story of the stage building. In Pergamo a high floor was already the ancient pavement; in Cosos it was constructed by filling in and by retaining walls. (See Oberfield-Cetinch. p. 109).

But Epidaurian also will have rooms in the theatres in Messene, [illegible]

The rules instruct us and this correctly amounts to:--

"The diameter were portions of a successive well furnished w [illegible]

and therefore was divided into supports and panels. In course

which our ancestors so wisely said:-- 'Never dispute with one who denies your principles.'"

And now in conclusion:-- since gods, i.e., men representing them, were not always let down from the window of an upper story on the roof by means of a crane, and also orators could not be brought before the people in this way, then must a natural method be left open for them. And this may be determined from the ruins. The roof of the proscenion or the floor of the logeion could be reached by ramps or stairs. In Epidauros are arranged beside the paradoi two doorways, one of w which led to a ramp and the other into the orchestra. Gods and men thus did not come into collision with each other; both had separate ways for the former to reach the house roof, for the latter to appear on the sidewalk before the house. So much is given by the reality!

This purpose was otherwise attained by a stairway, as may still be seen at the Theatre in Priene. A stairway with 12 steps is arranged at the end of the stage building, and of which 6 steps are still preserved, leads to the roof of the proscenion. But according to the words of the editor of the cited work on Priene (p. 245), these were not in the original plan. "The decision to add the stairway was matured during the construction, which one may see on the architrave of the proscenion, and also that the doorways in the upper story were not later additions. They were projected, when men were working at the height of the architrave".(Sic -- who was there?).

In Oropos and Eretria the orchestra was sunk so deeply, "t "that the pavement of the paradoi at its outer beginning was level with the floor of the upper story of the stage building. In Eretria a high floor was actually the ancient pavement; in Oropos it was constructed by filling in and by repaining walls. (See Dörpfeld-Reisch. p. 105).

But Buchstein also will have ramps in the theatres in Magnesia, Pompeii, Sicyon, Megalopolis, Delphi and Athens.

The ruins instruct us and this chiefly amounts to:--

"The pinakes were portions of a supporting wall furnished w with doors, that was formerly constructed entirely of wood, and therefore was divided into supports and panels. In course

The stone supports repeated petrifaction during the entire Greek period. The entirely stone proscenion belongs to the period of transition from the Greek to the Roman style".

These are the simply honest words of O. Puchstein, to which I must here restrict myself according to my observations at the [illegible] "[illegible] the expression of individual taste", which no one can deny, but by which the facts in the history of art will not be effaced in the least.

According to what has been developed, opinions on the original form of the audience room and of the orchestra do not diverge, nor do those on the actual form of the proscenion [illegible] tural form of the upper story of the stage building.

[illegible] and since they have an awakening effect, will lead in certain cases to truth and knowledge.

Dörpfeld and his followers still permit the rude to appear on the proscenion roof, the actors on the contrary raise in the orchestra in common with the chorus, and they regard the ornamental wall of the proscenion as the playing wall (background 7) in the theatre, whereby the objection that the thymelikes and the scenikes were covered at the same time, it was sought to remove on account of a picture (Plate XIII) in the Theatre at Eretria, in which a number of men stand around in student lines, but as the participants in a drama never stood.

To utilize a theatre building, as he desired to do at the Tempelhof in Meselpolis as a background for a drama with a suspended cloth background, is to be rejected for technical theatrical and other reasons, as well as the intermediate st-

of time the wall was seized by a petrifying process, so to speak, that first affected only the supports, with the ceiling on the beams. The stone supports took the form of columns with a corresponding ornamentation of the entablature. The stone supports resisted petrifaction during the entire Grecian period. The entirely stone proscenion belongs to the period fo transition from the Grecian to the Roman style".

These are the simply honest words of O. Puchstein, to which I must here restrict myself according to my observations at the different places. Everything elsewhere presented -- "is the expression of individual taste", which no one can deny, but by which the facts in the history of art will not be affected in the least.

According to what has been developed, opinions on the original forms of the audience room and of the orchestra do not diverge, nor do these on the actual form of the proscenion with its means of access (ramps and stairs), and also the belief is everywhere adopted, that we know nothing of the structural form of the upper story of the stage building.

Variations on the theme already exist by reason of the gaps, and since they have an awakening effect, will lead in certain cases to truth and knowledge.

Dörpfeld and his followers still permit the gods to appear on the proscenion roof, the actors on the contrary being in the orchestra in common with the chorus, and they regard the ornamental wall of the proscenion as the playing wall (background ?) in the theatre, whereby the objection that the thymelikes anf the scenikes were covered at the same time, it w was sought to remove on account of a picture (Plate XIII) in the Theatre at Eretria, in which a number of men stand around in straight lines, but as the participants in a drama never stood.

To utilize a theatre building, as he desired to do at the Thersilion in Megalopolis as a background for a drama with a suspended cloth background, is to be rejected for technical theatrical and other reasons, as well as the intermediate structure of the fabulous scenothek with its stone threshold tracks for moving the great wooden frames covered with cloth.

A drastic perspective view of the peculiar design was furnished by A. Streit.

O. Puchstein, contrary to the views of Dörpfeld, places the chorus in the orchestra, refers the scenikes to a covered podium with parascenion, to which ramps or stairs led up. On the other hand the gods continue to dangle or disport themselves with mortals on the boards of the podium.(See view of the stage of Epidauros in the attempt at restoration, p. 1, Figs. 425, 426).

New discoveries, more finds and more thorough study will indeed bring "more light"here also. [1]

*Note 1. On the theatres in Sillyon, Perge, Aspendos, Side, see Niemann & Petersen. Städte Pamphyliens und Pisidiens I. Vol. 1. Vienna. 1890. p. 51, 70, 102, 147; plates 14, 20-27, 29, especially the beautiful restorations of the stage building of Aspendos (by G. Niemann on Pl. 27). On the Theatre in Pergamon, see Dritter vorläufiger Bericht über die Ergebnisse der Ausgrabungen von Pergamon u.s.w. p. 40 et seq.Berlin. 1888. A rich list of dimensions of antique theatres is to be found in Müller. Bühnenalterthümer. p. 4 - 14.*

A contribution to the fulfilment of this pious wish was recently attempted by the highly gifted A. Mau, who died meanwhile, induced by the great Theatre at Pompeii, of the time preceding or at the beginning of the tufa period (200 B.C.), of which furthermore only the audience room is made known, but the existence of the stage is termed probable.

About 100 or 80 B. C. is made credible the erection of the now destroyed stage building"in the oldest form", with one f facade and three doorways at the ground levell between "oblique-angled"parascenions. (See plan in his book). Behind the facade is given a stage hall (in reality a passage 6.56 ft. wide and 55.7 ft. long -- 6.56 ft. is no depth for a hall!), which men reachedfrom the exterior through five doorways. As interesting additions were mentioned 6 water basins of different sizes, of circular and square ground form, within the orchestra, that according to the section drawn, still exist beneath the pavement of the orchestra. What they had to do with the building is not further stated.

Moreover in the foundation of a contemporaneous building [illegible] wall at the right side of the room (Plate II of his work), one on the left side is merely conjectural. Both toilets are assumed to be carried up high in the restored second floor, which is described as the "oldest form of the house building". [1]

[illegible] Van Nitt, J. Vais, Deutsch Ital. Wort. Vom. Abd. [illegible] 27, 2. Rome. Leo. 1926.

A second plan, but without the obvious parsonation, "yet in considerable dimensions", suggestive of the cohors' hall, this is made at least [illegible]. Gasp and probably fits the foundations discovered, is given by Samsbein (p. 72) with the note, based "on sides of the Domus publicus the Tegulum stone in Tomori is still easily recognizable".

That a Roman stage was erected at the close mentioned period in the time of Sulla or shortly before, after Rome had already conserved for a century its wooden theatre (i.e. B.C.), that had to be torn down again as a piece of luxury, but inscribe theatre -- is still scarcely credible.

About 60 B.C. -- the time when Pompeii received its colony of Roman veterans -- or even only in 80 B.C. followed a transformation of the whole building, after it had existed for 20 years or even for but a few months, if one assumes the given limit of 80 B.C. In this the (oblique 2) parascenia (which were not are properly a characteristic of the Roman theatre) were omitted, for the construction of a raised stage for the entire length of the building, and of the great side entrances, containing the narrow passages behind the facade of the stage. About 1 B.C. was erected the stage casale with three doors and with rich architectural treatment, which must indeed monumental. These processes were thoroughly thoroughed in more than 50 years of work, wherein it is added on the occasion, that a processing from well was not impossible; that other things "might be, but were not so" and that "some things also remain obscure".

[illegible]

or 50 B.C. the play occurred in the Theatre in Pompeii in non

Further is the foundation of a constructed oblique parascenion wall at the right side of the plan (plate 11 of his work); the one on the left side is purely conjectural. Both together are assumed to be carried up high in the restored ground plan, which is designated as the "oldest form of the stage building". [1]

*Note 1. See Mitt. d. Kais. Deutsch Arch. Inst. Röm. Abt. Vol. 21. 1. Rome. Dec. 1906.*

A ground plan, but without the oblique parascenion, "yet in acceptable dimensions", especially of the actors' hall, that is made at least 14.8 ft. deep and actually fits the foundations discovered, is given bu Puchstein (p. 75) with the note, that"in spite of the Roman rebuilding the Grecian stage in Pompeii is still easily recognizable".

That a Grecian stage was erected at the place mentioned even in the time of Sulla or shortly before, after Rome had already possessed for a century its stone theatre (185 B.C.), that had to be tory down again as a piece of luxury, but instead in 55 B.C. received under Pompey its splendidly built stone theatre -- is still scarcely credible.

About 80 B.C. -- the time when Pompeii received its colony of Roman veterans -- or even only in 40 B.C. followed a transformation of the stage building, after it had existed for 20 years or even for but a few months, if one assumes the given limit of 80 B.C. In this the (oblique ?) parascenions (which were and are properly a characteristic of the Roman theatre) were omitted, for the construction of a raised stage for the entire length of the building, and of the great side entrances, retaining the narrow passage behind the facade of the stage. About 1 B.C. was erected the stage facade with three doors and with rich architectural treatment, which must indeed harmonize. These procedures were thoroughly described in more than 50 pages of text, wherein it is added on the occasion, that a proscenion front wall was not impossible; that other things "might be, but were not so"and that "some things also remain obscure".

A. Mau believes, that the contested question, whether 100 or 80 B.C. the play occurred in the Theatre in Pompeii in the

[illegible] (Thorfeld) up on the roof of the processions (Dept-[illegible]) [illegible] [illegible] [illegible]

orchestra (Dörpfeld) or on the roof of the proscenion (Puchstein), cannot finally be answered at Pompeii, which may well be accepted.

A. Mau holds it to be very slightly probable, "that men acted before a proscenion between the two pilasters flanking the opening of the orchestra (see plan) or even before the proscenion extending between the parascenion fronts in the orchestra". (p. 53, Sect. 4), in order to come to the following conclusion on page 4:-- "All this may be conjectural possibilities, but not proof. But now when all these suggestions speak for the playing in the space between the parascenions, but against the playing on a stage contained in even this room, it appears only to remain unnecessary for the drama to occur in this room, but on the level ground. There was no proscenion, and then men would designate any decoration placed before the stage facade as a movable proscenion".

"There I stand now, I a poor fool,-- and I am as wise as before"! That in certain pieces some role bearesr had to play on a logeion Dörpfeld-Reisch grant; but on the contrary in P Pompeii it is now placed high and low on the sidewalk, in spite of the fact that men were already so reckless 250 years earlier in the mother country, and kept apart the different actors according to their rank, and even furnished the higher ones with broad and convenient ramps for ascending to the proscenion roof.

The Mittheilungen present no more architecturally, than what is already sufficiently known, at most that the circumstantial details, so poor on the actual monuments and so rich in mysteries, just as in the book on theatres mentioned, still has a disturbing effect. "Everything alive from the living" -- but the results in Pompeii afford nothing, that may take form.

Allied to the theatre, both in purpose as well as in the stepped arrangement of the audience room is the Odeion, intended for the presentation of oratorical and musical pieces.

No odeion, as a permanent structure, appears to date earlier than the era of Pericles, at least in Athens. According to Plutarch (Perikles 13), "it had in accordance with its internal arrangement many seats and numerous columns. The roof w

[illegible] "design [illegible] upon his brow."

(Jackson, Thorn.).

"In an [illegible] observer, [illegible] for the first time [illegible] the introduction of a material [illegible] at the [illegible] (Jackson), [illegible] as a chosen index of the [illegible], [illegible] how the different arts should be performed on the flues, by [illegible] or on the [illegible]. In [illegible], the [illegible] also [illegible] considered to be the place for [illegible] [illegible]".

It was [illegible] during the war with [illegible], but was rebuilt [illegible] by King Ashurbanipal I (668-627 B.C.): it is now [illegible]

[illegible] consequently [illegible] from [illegible] the structure; columns of stone and [illegible] the [illegible] [illegible] (Jack V, [illegible]).

[illegible] (Jack I, 24) [illegible] of work: "[illegible] Sanhedrin or Elsewhere and the [illegible] is a building, that [illegible] or a [illegible] of the [illegible] of [illegible]. But it was built a second time, for the earlier one was burned by Julian, [illegible] be [illegible] [illegible]".

Although the [illegible] of the purpose of the structure are entirely [illegible] and [illegible], the defensive [illegible] on the [illegible] of the [illegible] leave great [illegible] for the play of the [illegible]. Yet we find allied designs of a later time [illegible], which may supply a [illegible] and data for the [illegible] of the earlier [illegible].

[illegible] (Vitae [illegible] II, 8) [illegible] that [illegible] [illegible] a "[illegible]" for the [illegible] in honor of [illegible]. More [illegible] was of cedar wood; [illegible] was likewise [illegible] in [illegible] work, i.e., of which wood was [illegible] [illegible], a [illegible], where life was not to be "[illegible]" in the [illegible] [illegible]. He also built for the [illegible] [illegible] "covered [illegible]", [illegible] much interior to the [illegible], "but

was steeply inclined and terminated in a single apex. The whole must have been a representation and imitation of the tent of the Persian king. Pericles likewise had supreme control here.

"There comes Zeus with sea-onion head, Pericles
And bears the Odeion high upon his brow."
(Kratin. Thrak.).

"To earn honor thereby, Pericles now for the first time caused the introduction of a musical contest at the Panathenian (festival), and himself as a chosen judge of the prize, arranged how the different parts should be performed on the flute, by song, or on the lute. And as then, the Odeion also later continued to be the place for musical contests".

It was burned during the war with Mithridates, but was rebuilt again by king Ariobarzanes II (62-52 B.C.); it is now gone from the site without a vestige.

The statements of Plutarch agree with those of Vitruvius concerning the form of the structure; columns of stone and over it a wooden roof, of the masts and yards of ships from the Persian booty.(Book V, Chap. 9).

Pausanias (Book I, 20) confirms the statements of both; "Near the Sanctuary of Dionysos and the Theatre is a building, that must be an imitation of the tent of Xerxes. But it was built a second time, for the earlier one was burned by Sulla, when he conquered Athens".

Although the statements of the purpose of the structure are entirely clear and undoubted, the defective remarks on the form of the building leave great opportunity for the play of the imagination. Yet we find allied designs of a later time preserved, which may supply a representation and data for the restoration of the earlier ones.

Philostratus (Vitae Sophistarum II, 5) states that Herodes Atticus built a "theatre" for the Athenians in honor of Regilla, whose ceiling was of cedar wood; which was likewise remarkable in sculptured work,i.e., on which wood was excellent carving, a structure, whose like was not to be found elsewhere in the Roman empire. [1] He also built for the Corinthians the "covered theatre", indeed much inferior to the Athenian, "but

The architecture in Athens ([illegible] B.C.) certainly in its principal parts; indeed the name of Doric was not always applied to it [illegible] have been used in accordance with the directions of Vitruvius.

The Odeon is similar to that [illegible] the great Theatre; the auditorium space is constructed in semi-circular form, divided in sections by narrow stairways and accessed by a corridor [illegible] sanctuaries, but could not be later, according to all evidence. The stage, five steps above the lower level, was decorated with the mainstage space by the [illegible] orchestra and [illegible] side. Behind the stage was [illegible] a great vestibule, right and left of which rooms are [illegible]

The entire building was built of massive sandstone [illegible] walls with green tuff-arched openings [illegible] as the stage and the lower portion of the rows of seats, [illegible] the pavement of the orchestra, with its white and [illegible]

The room could contain about 3000 spectators, covered in it with a wooden slanting roof [illegible] columns have been difficult for a [illegible] 25 ft. in diameter, which could easily be accomplished by leaving a portion open as a skylight. (Which could be closed), whereby the scene was reduced. Vertical support or posts in the conservatic passage which have a solved the difficulty in the stretched manner, as at the Theatre in Pergamus and Syracuse (access of the best lens on the scenic conservatic passage), when instead of the proscenium arch, plain side lines between the windows in the semicircular [illegible] well are to be assumed.

[illegible] of such odeions still exist in Nicea (Nicaea) beside the large Theatre, in Iasos (Ias Turkey) in the vicinity of the aqueduct, and in Cuqui, in Mauretania. The remarkable and [illegible] of seats are [illegible] in the room in question the

which was till one of the few elsewhere remarkable".

*Note 1. See the attempt at restoration, a sketch by Tuckermann in Baumeister. Vol. 3. p. 1745.*

The structure in Athens (160-170 A.D.) remains in its principal parts; indeed the name of odeion was not always applied to it (but theatre or covered theatre, see above); but it must have been used in accordance with the directions of Pericles.

The plan is allied to that of the great Theatre; the audience space is constructed in steps in semicircular form, divided in sections by narrow stairways and separated by a concentric passage. The orchestra was somewhat larger than a semicircle, but contained no altar, according to all writers. The stage, five steps higher than the orchestra, was separated from the andience space by the paradoi and originally had a richly arranged monumental architecture with the usual three doors. Behind the stage wall was further a great vaulted hall, right and left of which rooms and staairways extended through three stories.

The entire building was built of massive ashlars; the outer walls with great round-arched openings still remain, as well as the stage and the lower portion of the rows of marble seats, and also the pavement of the orchestra, with its white and p pale green marble (cipolline) tiles.

The room could contain about 6000 spectators; covering it with a wooden structure without columns must have been difficult for a theatre about 253 ft. in diameter, which could only be accomplished by leaving a portion open as a skylight, (which could be closed), whereby the span was reduced. Vertical support by posts in the concentric passage would have s solved the difficulty in the simplest manner, as at the Theatres in Pessinus and Syracuse (traces of the tent bars on the middle concentric passage), when instead of the problematical skylight, high side lights through the windows in the semicircular enclosing wall are to be assumed.

Remains of such odeions still exist in Akrai (Sicily) beside the large Theatre, in Aperla (Asia Minor) in the vicinity of the acropolis, and in Pompeii, as well as elsewhere. The rear wall and rows of seats are cut in the rock in Aperla; the

[illegible] rows of seats per side. The most important orders must indeed in time have been adopted [illegible] orion ceilings, which were also used in the late period for the stables of horses and camels of the people.

As the largest in all Greece after that at Athens, Pausanias (VIII, 30) mentions that in Tegea. The temple was not consecrated by him to his description of Athena, but was added in the Book "Arcadia", "since heroes had not been commemorated structure, which surpassed all others in magnitude and beauty.".

In Tiryns and Mycenae was published in 1902 two other columns in Tiryns and Mycenae in "Die Grüne Kampfplatz und Bauten". II. p. 99-103. Vienna (1904). The walls in Mycenae are still about to the height of 32.5 ft. The plan is approximately square (50.3 x 31.0 ft.), and the walls are 2.25 ft. thick. A band connion divides the external walls into two stories, of which the lower is entirely plain and the upper is partially adorned by Doric pilasters. In the pronaos and southern walls are arranged alternately II centaurian columns. (Fig. 4a).

The form of the main columns cannot be determined with satisfactory. That found nearest the ruins of Tegea is essentially small: it scored only 20 perpendicular, while the one in Tiryns could receive 200.

Columns in Mycenae was one determined within the Cyclopean for from the time of Doran rule, and its capital were partly drawn and published. (Dorpfeld. Ibid. 1902. Pl. 4, 1). Centaurian in accord form with internal segmental base and column, connected with the mosaic pavement, and the semicircular stepped stonework for the audience are preserved.

The portico, that was surrounded on three sides by walls 11.5 to 12.5 ft. wide, was screened by three doorways of the basement. Behind the segmental semicircular wall of the audience room is constructed a portico with seats, behind which [illegible] - to a small court. (Fig. 4b).

After Tegea (Delphia. Pl. 6. 80 et seq. Berlin. 1909). E. Dörpfeld would also designate the buildings as "Doric halls", where the roof is "with a lowical roof as a sounding board"

orchestra had a diameter of 19 ft., around this being only 6 rows of seats upwards. The most important cities must indeed in time have been adorned by such odeions, which were also u used in the late period for the sittings of courts and assemblies of the people.

As the largest in all Greece after that at Athens, Pausanias (VII, 20) mentions that in Patara. The former was not specified by him in his description of Athens, but was added in the Book "Achaia","since Herodes had not then commenced the structure, which surpassed all others in magnitude and beauty.".

By Niemann and Petersen was published in 1892 two other odeions in Termessos and Gretopolis (See Städte Pamphyliens und Pisidiens. II. p. 98-99. Vienna. 1892). The walls in Termessos still stand to the height of 32.8 ft. The plan is approximately square,(80.0 × 81.0 ft.), and the walls are 3.28 ft. thick. A band cornice divides the external walls into two stories, of which the lower is entirely plain and the upper is partially animated by Doric pilasters. In the eastern and southern walls are arranged altogether 11 rectangular windows. (Fig. 438).

The form of the main cornice cannot be determined with entire certainty. That found beneath the ruins of Gretopolis is essentially smaller; it seated only 200 persons, while the one in Termessos could receive 600.

Likewise in Epidauros was one determined within the Gymnasium from the time of Roman rule, and its remains were properly drawn and published. (Praktika. 1904, 1906. Pl. A, 1). Rectangular in ground form with internal segmental rear wall., podium, orchestra with its mosaic pavement, and the segmental stepped structure for the audience are preserved.

The podium, that was surrounded on three sides by walks 11.8 to 12.8 ft. wide, was entered by three doorways of the background. Behind the segmental enclosing wall of the audience room is constructed a corridor with stairs, behind which adjoin 4 to 6 small rooms.(Fig. 434).

After Pomtow (Delphika. II. p. 69 et seq..Leipzig. 1909), H. Thiersch would also designate the tholuses as "music halls", where the open tholos "with a domical roof as a sounding board"

would be termed the natural precursor of the enclosed music building.

"The great round hole in the centre of the circular structure (the Tholos) at Epidauros might be the place for the construction of the wooden podium, and further the channels found beneath the pavement might be the cavities of the so-called labyrinth for strengthening the sound"! (Fig. 93, our drawing of the foundations).

[illegible] Feet.

Depth, Discharge, Gradient, Velocity and Depth.

The channel was the course intended for racing contests, long and narrow, semicircular at one end, rectangular at the other. There were stepped seats for the spectators along the long sides and around the semicircular end, as in the Roman circus and colosseum. The judges of the contest occupied special chairs between these, protected by roofs in Roman fashion and a marble altar of Jupiter, from whose steps a criss-cross on the goddess looked upon the contests. (Chapman, VI, 69).

The application of "stadium" for the long course must have been derived from the most famous one in Olympia, which was probably a stadion or 606 Greek "feet" ft. in length, and it formed a model in plan and arrangement for all [illegible]

[illegible] Roman stadium [illegible] 1.5 miles. [illegible] cross extended only as far as the arrangement of seats; [illegible] antes (arenaes), at the beginning of the curved section, or a [illegible] of columns set between the curved walls marked the end. The starting place was at the rectangular end.

A system of drains was provided for keeping the course dry, which was covered by thin slabs and earth, and which vestiges are still preserved in Rome. The course was separated from the spectators by a parapet wall, behind which was placed an [illegible], which was 5.[illegible] ft. wide in Rome; the [illegible] [illegible] to pass into drains to the sewer. This [illegible] could also be [illegible] by a moveable drain beneath it. [illegible] received sea water over their heads flowing down from the [illegible]. The development of the cascade was one foot lower than that of the course; the [illegible] wall was 7.[illegible] ft. [illegible] above a foundation wall of the same height; [illegible] rows of seats, divided into sections by narrow alleyways.

[illegible]

[illegible] reference to the course and the seats was preserved. "Ambulacra" (?), [illegible] describes this as the so-called covered [illegible] in Olympia, which was also remarkable for the [illegible]

DIVISION XI. BUILDINGS FOR GYMNASTIC SPORTS AND E EXERCISES.

Stadion, Hippodrome, Gymnasion, Palaestra and Baths.

The stadion was the course intended for racing contests, long and narrow, semicircular at one end, rectangular at the other. There were stepped seats for the spectators along the long sides and around the semicircular end, as in the theatres and odeions. The judges of the contest occupied special places between these, opposite to which in Olympia was erected a marble altar of Demeter, from whose steps a priestess of the goddess looked upon the contests. (Pausanias. VI, 20).

The appelation of "stadion" for the race course must have been derived from the most famous one in Olympia, which was exactly a stadion or 600 Greek (Olympian) ft. in length, and it indeed served as a model in plan and arrangement for all others.

The rounded portion (sphendone) was not used for races; the course extended only as far as the straight side; projecting antes (sphenes) at the beginning of the curved portion, or s shafts of columns set between the parapet walls marked the end. The starting place was at the rectangular end.

A system of drains was arranged for keeping the course dry, which was covered by thin slabs and earth, and whose vestiges are still preserved in Athens. The course was separated from the spectators by a parapet wall, behind which was placed an entrance, which was 5.97 ft. wide in Athens; the public entered there to pass from thence to the seats. This entrance could also be drained by a masonry drain beneath it, which received and removed the rain water flowing down from the seats. The pavement of the passage was one foot lower than that of the course; the parapet wall rose 5.38 ft. above it and above a foundation wall of the same height; then followed the rows of seats, divided into sections by narrow stairways. (Fig. 435).

For the judges of the contest and the competitions, a separate entrance to the course and the seats was arranged. Pausanias (VI, 20) desigates this as the so-called covered passage in Olympia, which was also rediscovered by the German expe-

[illegible] addition. For the long [illegible] was also the subterranean [illegible] [illegible] provided with the means of the [illegible].

As for theatres, natural slopes were also mostly chosen as locations for the stations, between which the courses was excavated, as in Athens, to some certain [illegible] and conveniently the substructure for the seats; or this latter was formed by [illegible] banks of earth thrown up, as in Ulcinia, or was entirely built of stone masonry, as in Delphi (Pausanias, X, 32), or combined partly of stone masonry and partly of natural earth slopes, as in Messene. Marble seats are most used in [illegible].

Some one of seats in Messene and Sunodiorient at the latter place the station was semicircular at rear end, a form of [illegible] belonging to the late period, as well as the orders in Lycosura, which according to an inscription, was later changed into an amphitheatre. As in the theatre, the space for the audience had to accommodate the maximum number of men, while the number of the built rows of seats could where be as great as in the theatre. The location in Greek theatres has only 17 rows of seats, that is 41 and only 10, while Aphrodisias shows 35; Ephesus seats 14,000 men, while 20,000 found room in Athens. The dimensions of the still best preserved stadions are not very considerable, for those of the [illegible] are:--

| | | |
|---|---|---|
| In Athens | 109.4 ft. wide and 671 ft. long. | |
| [illegible] | [illegible] | |
| In Aphrodisias | 94.4 ft. wide and 765 ft. long. | |
| In Olympia | 105.0 ft. wide and 664 ft. long. | |

Only seven vestiges remain of the Panathenaic Stadion on the left bank of the Ilissos; the slopes, the ruins of the walls, and the cleared covement of the arena readily permit a restoration of the whole. No more beautiful location for the courses could have easily been chosen and utilized, than is found there. The end is placed parallel to the course of the river and was determined by a portico with columns on a [illegible], [illegible] the longitudinal axis of the stadion, and afforded access to the [illegible]

expedition. For the same purpose was also the subterranean passage 12.45 ft. wide found at the Athenian stadion, whech terminated with the arena of the curved end.

As for theatres, natural slopes were also mostly chosen as locations for the stadions, between which the course was excavated, as in Athens, to thus obtain cheaply and conveniently the substructure for the seats; or this latter was formed by simple banks of earth thrown up, as in Olympia, or was entirely built of stone masonry, as in Delphi (Pausanias, X, 32), or composed partly of stone masonry and partly of natural earth slopes, as in Messene. Marble seats are mentioned in Corinth, Delphi, Athens etc. Porticos were carried along the upper row of seats in Messene and Aphrodisias; at the latter place the stadion was semicircular at both ends, a form of plan already belonging to the late period, as well as the course in Laodiceia, which according to an inscription, was later changed into an amphitheatre. As in the theatre, the space for the audience had to accommodate the maximum number of men, while the number of the built rows of seats could nowhere be as great as in the theatre. The Stadion in Perga therefore had only 17 rows of seats, that in Aizani only 10, while Aphrodisias shows 26; Aizani seated 12,760 men, while 50,000 found room in Athens. The dimensions of the still best preserved stadions are not very different, for those of the arena are:--

| | |
|---|---|
| In Athens | 109.4 ft. wide and 671 ft. long. |
| In Aizani | 152.0 ft. wide and 725 ft. long. |
| In Aphrodisias | 98.4 ft. wide and 745 ft. long. |
| In Olympia | 105.0 ft. wide and 691 ft. long. |

Only scanty vestiges remain of the Panathenian Stadion on the left bank of the Ilissos; the slopes, the ruins of the walls, and the cleared pavement of the arena readily permit a restoration of the whole. No more beautiful location for the purpose could have easily been chosen and utilized, than is found there. The end is placed parallel to the course of the river and was decorated by a portico with columns or a portal, opening toward the great stone quarry lying on the longitudinal axis of the stadion, and afforded access to the public.

The first building was erected by the Swedish Government and E.O.T.; Swedish factories supplied it with seats of Swedish ash; it is about 300 years large. At the court of King Frederic of Prussia, the ruined portion of the Schloss-Park was merely rebuilt by the German architect Gilly, thereby fixing the exact form of the plan and of the details.

Since the Olympic games have been again revived in a somewhat changed form, the question has been raised in the ancient home and most authority in white marble and put into use.

The last Temple of Jupiter statues, that in Olympia, that seated 40,000 to 50,000 men, was discovered by the German expedition [illegible] in the [illegible] proved to be a long rectangle of about [illegible] ft., surrounded by rails of porous stone. About this rectangle at a distance of 3.25 ft. extended a water channel with several basins, [illegible] in [illegible] the [illegible] portion of the space for spectators; artificial embankments were necessary for the southern and other. The seats for the public were of woodwork. At each end of the course is a limestone mill, which supported wooden posts at equal distance, separating 20 starting places. The exact distance from one starting point to the other between [illegible] in 600.27 ft. The southern wall terminates the course in rectangular form, and not in the semicircular form used elsewhere. From this fact the Stadion has had a single direct access, near which stood the altars of Terma as the protector of the contest and of the Demon of the favorable moment, to wear the contestants, "that yet all result lay in the hand of the deity", and on the right of the passage rose as a warning the bronze statue of Mnemosynes. 1, 2

Note 1. Measured of 708 ft. is given also 830 ft. Summerstein. [illegible] p. [illegible].

Note 2. Ausgrabungen. IV. p. 60, pl. 39; V. p. 24, pls. 38 [illegible], also Sauer. p. 88, 89.

The Stadion at Delphi was so arranged, that one longer side lay on the slope, the other being constructed by a resisting wall built of polygonal masonry, while the arena was prepared

The first building was erected by the orator Lycurgus (850 B.C.); Herodes Atticus supplied it with seats of Pentelican marble about 500 years later. At the cost of king George of Greece, the ruined portion of the semicircular end was merely rebuilt by the German architect Ziller, thereby fixing the exact forms of the plan and of the details.

Since the Olympic games have been again revived in a somewhat changed form, the stadion has been rebuilt in the ancient form and most splendidly in white marble and put into use.

The most famous of Grecian stadions, that in Olympia, that seated 40,000 to 50,000 men, was uncovered by the German expedition in 1879-1881 in its most important parts. The course proved to be a long rectangle of about 702 × 105 ft., surrounded by sills of poros stone. Around this rectangle at a distance of 3.28 ft. extended a water channel with several basins, from which fresh water could be taken during the games. The slope of the Kronion hill was utilized for the northern portion of the space for spectators; artificial embankments were necessary for the southern and others. The seats for the public were of woodwork. At each end of the course is a limestone sill, which supported wooden posts at equal distances, separating 20 starting places. The exact distance from one starting point to the other between centres is 630.65 ft. The eastern wall terminates the course in rectangular form, and not in the semicircular form used elsewhere. From the Altis the Stadion has but a single direct access, near which stood the Altars of Hermes as the protector of the contest and of the Demon of the favorable moment, to warn the contestants, "that yet all result lay in the hand of the deity", and on the right of the passage rose as a warning the bronze statue of Strafzanes. [1, 2]

*Note 1. Instead of 702 ft. is given also 690 ft. Baumeister. II. p. 1104.*

*Note 2. Ausgrabungen. IV. p. 50, pl. 38; V. p. 24, pls. 36, 35; also Funde. p. 21, 22.*

The Stadion at Delphi was so arranged, that one longer side lay on the slope, the other being constructed by a retaining wall built of polygonal ashlars, while the arena was produced

by filling in the semicircular end is still well preserved. The northern longer side has 7 rows of seats. At the subsidence and stand 4 heavy piers, which are connected by semicircular arches, before which lay the enclosure limiting the course. The length of the course was 555 ft.

The Theatre at Epidauros, given by Kerbelias in his work "To hieron tou Asklepiou en Epidauroi", Athens, 1927, exhibits a plan with rectangular ends at the east and west sides. The half tone plates at page 104 of the work give information concerning the condition of the section and the rows of seats.

In Priene (see "Priene work", page 85[1]), the Stadion was built together with the "Ionic Gymnasion". It is a rare Hellenistic work due consists of course enclosures like Kerkyra, the subject case, with a Doric proscenium across side. The length of the course amounts to 650 ft., and a part of the rows of seats is still preserved. Plan 50 gives the ground plan of the [illegible] which are connected together by a doorway.

In the [illegible] "[illegible] dunesen" on the excavations at Miletus, Th. Wiegand (died in Miletus in April, 1936) published information on the Stadion at Miletus. This was considered with an entrance portico 24.7 ft. wide, that consisted of 2 rows of 3 arches each with Corinthian columns spaced 9.84 ft. on centers. Only the middle one is water, being 12.5 ft. The auditorium of the Stadion was measured by Architect Ziegeler (Ulrichsen) and published in the Report mentioned. It cannot be placed earlier than in the 3 rd century B.C. In its plan the gateway of the stadion has great similarity to that at Kerkyra. The length of the course is about 550 ft. The northern wall of the portico with a vaulted entrance and the remains of the adjacent seats lies hundred from the entrance area. The total width of the "Scene" of the stadion was 242 ft. (Fig. 427 gives the ground plan of the entrance portico of the stadion, after the drawing in the Report mentioned, page 22.).

The Hippodrome was the race course for horses and chariots. Its general arrangement and form was similar to the race course for foot racers but length and width had to be greater.

by filling in the semicircular end is still well preserved. The southern longer side has 6 rows of seats. At the entrance end stand 4 heavy piers, which are connected by semicircular arches, before which lay the enclosure limiting the course. The length of the course was 585 ft.

The Stadion at Epidauros, given by Kabbadias in his work " "To hieron tou Asklepion en Epiraurei", Athens,1900, exhibits a plan with rectangular ends at the east and west sides. The half tone plates at page 104 of the work give information concerning the condition of the stadion and the rows of seats.

In Priene (see Priene work, page 258), the Stadion was built together with the "lower Gymnasion". It is a late Hellenistic work and consists of course enclosures like gateways, the audience area, with a Doric promenade portico above this. The length of the course amounts to 627 ft., and a part of the r rows of seats is still preserved. Figa 436 gives the ground plan of the so-called lower gymnasion with the stadion, which were connected together by a doorway.

In the fourth preliminary "Bericht (Report) der königliche Museen" on the excavations at Miletus, Th. Wiegand (died in Miletus in April, 1906) published information on the Stadion at Miletus. This was furnished with an entrance portico 74.5 ft. wide, that consisted of 2 rows of 8 arches each with Corinthian columns spaced 9.45 ft. on centres. Only the middle one is wider, being 12.5 ft. The architecture of the arcades was measured by Architect Zippelius (Carlsruhe) and published in the Report mentioned. It cannot be placed earlier than in the 3 rd century A.D. In its plan the gateway of the stadion has great similarity to that at Ephesus. The length of the course is about 820 ft. The northern wall of the parados with a vaulted entrance and the remains of the adjacent seats lies detached from the audience area. The total width of the facade of the stadion was 242 ft. (Fig. 437 gives the ground plan of the entrance portico of the stadion, after the drawing in the Report mentioned, page 22.).

The Hippodrome was the race course for horses and chariots. Its general arrangement and form was similar to the race course for toot races; but length and width had to be greater,

in order to have room for placing the row of horses and chariots.

Therefore the Hippodrome consisted of the level race course (*ippodromo*), divided down the middle by a single bank of earth into two orders of unequal length (see 'ippodromo'), terminating at one end in semicircular ends, at whose centre stood the goal, about which horses and chariots came under. At the opposite end was the starting place for the horses (*ammissio*), which in Greece had the form of the bow of a vessel, 'that extends its prow into the race course'. Each of these starting places, in which were built the places for chariots, had a number of stalls; they said in a portico, the ornamental portico of the carceres. Directly at the prows of the ornamental vessel stood an altar of sun-dried bricks, on which was a bronze image with outspread wings: before it on the vessel's prow was a bronze dolphin on a balanced rod.

When the signal for starting was given, the gate was raised on high, so as to be visible to the assembled spectators, the dolphin was lowered to the ground. The rope stretched before the horses was then dropped, so that it fell first for those next the carceres; then the chariots started, 'so that those in front on the ship's prow were in line with each other. Thus we can come to know that it isn't our skill or our willingness of their horses'.

A chariot beginning at the longer side of the race course, [illegible] stadium: on this side the Emperors, the Senator of Rome, in the form of a wooded altar, which formerland the horses. In these, thus as a rear stage, 'that shone like fire', [illegible] the turning point of the course.

On one goal stood a bronze statue of Hippolamio with a fillet in her hands. The adjacent conjectural image (Fig. 4b) of the Hippodrome in Olympia by Ulrich and Vitzthum give an approximate idea of the arrangement, but do not entirely correspond to the comments not very coherent text of Cassiodorus.

The plan of the Hippodrome in Tomiuse (Fig. 4a), with the arrangement of the race course, the form of the starting [illegible] one of the spina extending along the middle, is of the later

in order to have room for placing the row of horses and chariots.

Therefore the Hippodrome consisted of the level race course (dromos), divided along the middle by a simple bank of earth into two halves of unequal length (see Pausanias), terminating at one end in semicircular shape, at whose centre stood the goal, about which horses and chariots must turn. At the opposite ent was the starting place for the horses (aphesis), which in Olympia had the form of the bow of a vessel, "that extends its prow into the race course". Each of these starting places, in which were built the places for chariots, had a length of 400 ft.; they ended in a portico, the so-called portico of the Agnaptos. Exactly at the middle of the prow of the vessel stood an altar of sun-dried bricks, on which sat a bronze eagle with outspread wings; before it on the vessel's prow was a bronze dolphin on a balanced beam.

When the signal for starting was given, the eagle was raised on high, so as to be visible to the assembled spectators; the dolphin was lowered to the ground. The rope stretched b before the places was then dropped, so that it fell first for those next the agnaptos; then the charioteers started, "so that those in front on the ship's prow were in line with each other. Thenceforth came the test of their own skill and of the swiftness of their horses".

A passage terminated at the longer side of the race course, which was carried beneath the place for spectators (as in the stadion); on this stood the Taraxippos, the terror of horses, in the form of a round altar, which frightened the horses. In Nemea, this as a red stone, "that shone like fire", formed t the turning point of the course.

On one goal stood a bronze statue of Hippodamia with a fillet in her hands. The adjacent conjectural plans (Fig. 438) of the Hippodrome in Olympia by Hirt and Visconti give an approximate idea of the arrangement, but do not entirely correspond to the otherwise not very coherent text of Pausanias.

The plan of the Hippodrome in Pessinus (Fig. 439), with its arrangement of the race course, the form of the starting place, and of the spina extending along the middle, is of the later

tuated or of Ionic origin. But the conversion of the temples and some Doric temples retrospectively, which may have i n mind in the long terraces arranged with the theatre (Berenson and Jeger).

The spaces for scenatores, composed of step-like rows or ambulacra, as in the section and similarly divided, also lay on natural slopes or were constructed of earthen embankments. (Jeger).

Gymnasions and palaestras are often of equal importance. O. Frykenius and strictly unnecessary, the latter was the place for contests in physique and with the ephebes. The ephebion and gymnasium being the places instituted for the performance of the national games, so were the gymnasium the places for the exercises preparatory thereto. They were instituted among those public establishments in which Greeking youths received the chief branches of their training, the development of physical strength.

The earliest gymnasions must be regarded as simple places [illegible] enclosed by walls, as Pausanias describes them at Pisa. [illegible] There in the archaic Gymnasion in the city of Pisa, where the athletes performed their exercises before coming to Olympia, was first placed within the walls of the diffrent racecourses, separated from each other by close trees, [illegible] intended for running, the courses for competition in the five contests; also the Pankration, where one judges of the contest placed together those of equal age or equal strength. Continuous three longer rooms were built either only for exercise-place for competition with the rings (the palaestra proper), and when united in the exercise of the rings, they further experienced in Olympia with the soft-bronze on the bands. From its form this room was termed the "square". Other place was likewise enclosed by walls and was called "xystos", from its soft floor; it was opened to the courts during the festival period. Two bronze statues of boys in the room of contestants in the five contests decorated the entrance to the Xystos. Altars of Heroines, of Eros, and of Demeter, were probably set in these places.

period or of Roman origin. But the connection of the theatre and race course remains interesting, which may have its model in the long terraces arranged with the theatre (Pergamon and Aegai).

The space for spectators, composed of step-like rows of seats, as in the stadion and similarly divided, also lay on natural slopes or were constructed of earthen embankments. (Olympia).

Gymnasions and Palestras are often of equal importance. O Originally and strictly understood, the latter was the place for contests in pugilism and with the rings. The stadion and hippodrome being the places intended for the performance of the national games, so were the gymnasions the places for the exercises preparatory thereto; they were included among those public establishments in which Grecian youths received the chief branches of their training, the development of physical strength.

The earliest gymnasions must be regarded as simple places for exercise in the open air, shaded by groves of trees, later enclosed by walls, as Pausanias describes them at Elis. (VI, 21). There in the archaic Gymnasion in the city of Elis, where the athletes performed their exercises before going to Olympia, was first placed within the walls of the different race courses, separated from each other by plane trees, one intended for running, the others for competition in the five contests; also the Pletherion, where the judges of the contest paired together those of equal age or equal skill. Adjoining these longer rooms were built smaller ones; the exercise place for competition with the rings (the palestra proper), and when skilled in the exercise of the rings, they further exercised in fights with the softer thongs on the hands. From its form this room was termed the "Square". An other place was likewise enclosed by walls and was called " "Maltho", from its soft floor; it was opened to the youths during the festival period. Two bronze statues of boys in t the form of contestants in the five combats decorated the entrance to the Maltho. Altars of Hercules, of Eros, and of Demeter, were probably set in these places.

In the gymnasion at Olympia were found pieces of armour for the five contests and for running, in their vicinity being a smaller and separate room for men with the rings.(Heberdey), omaxis of the colonnade along the eastern wall, thus facing west and south, the barrooms of the athletes.(Lamman-tea. VI, 24).

According to the excavations of the German expedition, the palaestra in Olympia was a square Doric court with colonnade, 154.4 ft. along the side, surrounded by chambers and rooms like porticos, to which two colonnaded porticos (crossbeams) led, with two columns between antae of the Corinthian order. The court served for exercises and had in the northern part a peculiar pavement of grooved stone. The columns of the hall were of the Ionic order, so that all three orders occurred in the building.

In the deep rooms toward the north is thought to be recognized the Ephebeum, and beside this the Eleutheration and the Coniseration; a room on the east was the "Triglia cavatio", [illegible]

[illegible] with stone benches.

The Palaestra in Pompeii of the Greek period may be mentioned as another example.

Of the Gymnasion, only one southern portico of the Palaestra, the peristylium and of the eastern portico, 660.7 ft. long, were excavated, together with the Propylaion lying between the two, in whose vicinity lie ruins of the Roman Baths (the Olympeion of the Elis). This Gymnasion was not an enclosed building like the Palaestra, but an extended place loosely surrounded by Doric porticos. The eastern portico was in two stories, had a length of 660.7 ft., and it is regarded as a roofed station used in bad weather.[1]

Note 1. See Ausgrabungen. Vol. 7. p. 40, plates 38-40; also Curtius. I-161.

In one of the gymnasions in Elis was also found the council house of the Elians, called "Leitourgeion" after the builder. "In the sacra were given free addresses and literary works of all kinds were read. Statues were hung on around it, though merely for ornament and not for warlike use". A building er-

In the Gymnasion at Olympia were found places of exercise for the five contests and for running, in their vicinity being a smaller and separate room for men with the rings.(Palestra), outside of the colonnade along the eastern wall, thus facing west and south, the barracks of the athletes.(Pausanias. VI, 21).

According to the excavations of the German expedition, the Palestra in Olympia was a square Doric court with columns, 134.4 ft. along the side, surrounded by chambers and rooms like porticos, to which two columnar portals (prostasis) led, with two columns between antes of the Corinthian order. The court served for exercises and had in its northern part a peculiar pavement of grooved slabs. The columns of the hall were of the Ionic order, so that all three orders occurred in the building.

In the deep rooms toward the north is thought to be recognized the Ephebeum, and beside this the Elaothesion and the Conisterion; a room on the east was the "frigida cavatio", from its basin for bathing. Other rooms for indeterminate purposes were furnished with stone benches.

The Palestra in Pompeii of the Oscan period may be mentioned as another example.

Of the Gymnasion, only one southern portico of the Palestra, the beginning and end of the eastern portico, 690.5 ft. long, were excavated, together with the Propyleion lying between the two, in whose vicinity lie ruins of the Roman Baths. (See plan of the Altis). This Gymnasion was not an enclosed building like the Palestra, but an extended place loosely surrounded by Doric porticos. The eastern portico was in two aisles, had a length of 688.8 ft., and it is regarded as a roofed stadion used in bad weather. [1]

*Note 1. See Ausgrabungen. Vol. I. p. 40, plates 38-40; also Funde. I-III.*

In one of the gymnasions in Elis was also found the council house of the Eleans, called"Lalichmeion"after the builder. "In the same were given free addresses and literary works of all kinds were read. Shields were hung up around it, though merely for ornament and not for warlike use". A building er-

revealed in the Procession at Mantinea ("Economics, VIII, 9) was conferred for its beautiful stones and contained a hall with statues of Antinoos and paintings.

We see in the rooms of the gymnasions numerous for intellectual and physical development combined together, equally distinguished under a roof and by magnificence. The original wants by the addition of the portices mentioned, and by the connection of the Palaestrion.

Yet much more remains of these extensive and magnificent structures of the late period for intellectual instruction and physical exercise; only ruins in Athens, Pergamos, Mantinia, Ephesus, Alexandria-Troas, etc., still prove their existence, splendor and extent; the two best preserved ruins in Athens and Alexandria-Troas correspond nearly to the requirements of Vitruvius, even if they are not placed after the same model.

Italy; therefore we merely give a preference arranged according to those in Greece, and be accordingly neither colonnades around them, the courts being of square or elongated form; three of these sides, the fourth facing south or opening to the south, but doubled, so that the rain might not be driven into the interior; also with these colonnades were to be seen, Exedras and friends of scientific efforts; with the double portico in the middle was to be the hall for young (ephebion), a very spacious addition furnished with seats and a small one-story higher than broad; on the right of this, the hall for sack "Tabling (xonkyrion), where the sack of sand rugging from the ceiling was seen; besides it being the dust-

themselves with dust after the exercise, then in the cooler the cold bath (lutron); but on the left of the entrance the warmer room (el-ithesion), and a fresh bath adjoining this, connected to which is the vaulted sweat bath (sweat room) after the exercise, then the "Tepidarium" where the exercise this the warm bath.

erected in the Gymnasion at Mantinea (Pausanias, VIII, 9) was farfamed for its beautiful stones and contained a hall with statues of Antinous and paintings.

We see in the rooms of the gymnasions arrangements for intellectual and physical development combined together, equally distinguished under a roof and by magnificence. The originally simple enclosed room becomes a richly treated architectural whole by the addition of the porticos mentioned, and by t the connection of the Lalichmeion.

Not much more remains of these extensive and magnificent structures of the late period for intellectual instruction a and physical exercise; only ruins in Athens, Ephesus, Magnesia, Hierapolis, Alexandria-Troas, etc., still prove their existence, splendor and extent; the two best preserved ruins in Ephesus and Alexandria-Troas correspond nearly to the requirements of Vitruvius, even if they are not shaped after the same model.

According to Vitruvius, gymnasions are "not customary in Italy"; therefore he merely gives a programme arranged according to those in Greece, and he accordingly requires colonnades around them, the courts being of square or elongated form; three of these simple, the fourth facing south or opening to the south, but doubled, so that the rain might not be driven into the interior; also with three colonnades were to be spacious additions (exedras) with seats for philosophers, speakers, hearers and friends of scientific efforts; with the doubled portico in the middle was to be the hall for youth (ephebeion), a very spacious addition furnished with seatr and about one-third longer than broad; on the right of this, the hall for sack fighting (korkyreion), where the sack of sand hanging from the ceiling was struck; beside it being the dusting room (conisterion), where the ring fighters sprinkled themselves with dust after the anointing, then in the corner the cold bath (lutron); but on the left of the ephebeion the unguent room (elatheseion), and a fresh bath adjoinind this, opposite to which is the vaulted sweat bath (twice as long as broad) with its heating chamber, also a "laconic hall" and opposite this the warm bath.

Intersecting (adjoining the nave of the nearby sanctuary we-
re described, according to Saboj), Vitruvius requires three
porticos, that contain areas for contests, one, the northern,
oriented like the southern and so be of considerable width;
the two areas single, so that they should nav- along both
sides next the wall and columns, raised footways, the central
space being lower, so that the outlined assessors might find
room on these footways and not be inconvenienced by the ori-
ginal contestants. The stoicbes could also exercise here in cover-
ed rooms during winter. Such a portico was termed a "xystos".
This and the double porticos were accounted by aforesaid and
[illegible] for [illegible].

Therefor the Vitruvian structure consisted of two adjacent
porticos; which was required in the first can nearly be prov-
ided in the Ephesian plan; combine therewith the Vitruvian
northern and the so-called double porticos with that required
on the south, omitting from the latter the xystos, the proper-
ness and the station, then will the second portion by Vitru-
vius be likewise correspondingly included within the limits of the
walls.

The Baths in Asnos have suggested that the two types of gym-
nasions of Alexandria-Troas and of Ephesus were likewise baths.
The plan of the former has been published by Koldewey,[1] from
new measurements. (Fig. 44).

[illegible] p. 45. Athens. 1891.

Since numerous rooms occur in the plans of gymnasions, sim-
ilar baths, dressing rooms etc., and washing basins were also
placed in one of the large conditions, so that nearly all rooms
required in the Roman Thermes existed here, it would not be
difficult to take one for the other, especially since data f
or the arrangements of both are so limited still. Yet the
correspondence at Asnos and Alexandria-Troas do not entirely c
oincide, and it is therefore believed, that in the latter
there other methods of obtaining existed, which were indeed
somewhat more complex, but had not reached the full refinement
of the Roman Imperial Baths.[2]

Externally (adjoining the rear of the complex structure were described, according to Reber), Vitruvius requires three porticos, that contain places for contests, one, the northern, doubled like the southern and to be of considerable width; the two others single, so that they should have along both sides next the wall and columns, raised footways, the central space being lower, so that the colthed spectators might find room on these footways and not be inconvenienced by the oiled contestants. The athletes could also exercise here in covered rooms during winter. Such a portico was termed a "xystos". This and the double portico were surrounded by shrubbery and promenades, adjoining these being a greater stadion with a space for spectators.

Therefor the Vitruvian structure consisted of two adjacent portions; what was required in the first can nearly be provided in the Ephesian plan; combine therewith the Vitruvian northern and the so-called double porticos with that required on the south, omitting from the latter the xystos, the promenades and the stadion, then will the second portion by Vitruvius be likewise completely included within the limits of the walls.

The Baths in Assos have suggested that the two types of gymnasions of Alexandria-Troas and of Ephesus were likewise baths. The plan of the former has been published by Koldewey,[1] from new measurements. (Fig. 440).

*Note 1. In Mitt. d. Kais. Deutsch Arch. Inst. Athen. Abt. p. 45. Athens. 1884.*

Since unguent rooms occur in the plans of gymnasions, also cold baths, dressing rooms etc., and washing basins were also placed in one of the large corridors, so that nearly all rooms required in the baths likewise existed here, it would not be difficult to take one for the other, especially since data f for the arrangements of both are so limited still. Yet the arrangements at Assos and Alexandria-Troas do not entirely c conicide, and it is therefore believed, that in the latter place other methods of bathing existed, which were indeed somewhat more complex, but had not reached the full refinement of the Roman imperial Baths. [2]

Note 2. Volkmann, p. 46.

The lower gymnasiums in Ephesus and Alexandria-Troas are seen Assos and the Roman imperial baths. This raises issues between the gymnasion and the baths, and the belief further [illegible] that [illegible] the [illegible] of the native Italian baths with the amphitheatre of the palaestra of the gymnasion or of the gymnasion itself.

No Greek city can be conceived without a gymnasion; Lycurgus alone could exhibit several of them. With the predominate and general development of physical exercise, and with the custom of the men to take an active part in the sports of the youths, and to devote a portion of their free time to them, it became a necessity of Greek life.

The lower Gymnasion at Priene consisted of a great court surrounded by colonns, that on two sides showed only plain walls as enclosures; on the third side lay three small rooms and a propylion with entrance on the fourth side was an added second portico, behind which lay five rooms. The connecting doorway towards the Stadion lay within one colonnade, that had no rooms behind it. (Fig. 4[illegible]).

The Gymnasion at Delphi had a colonnade portico 8[illegible] ft. long and an arrangement of baths. That at Epidauros was distinguished by its beautiful plan and the good proportions of its masses. The double portico recalls that of the Gymnasion at Priene; of good effect are the two-aisled hall and the subsequently built propylion on four columns and the accessions rooms. Baths, lecture hall and stone benches for the pupils are yet preserved and peculiarly impress the visitor. Fig. 44[illegible] gives an idea of the plan, after Kaschedius, with my sketch of the arrangement of the school in Fig. 44[illegible].

These are further to be mentioned:-- the Gymnasion in Vetera (Xanten, of Koenesol. XI. 1[illegible]6. I Series. 1[illegible]), the oicon-lar building in Olympia (text volume II. p. 10[illegible], Figs. 5[illegible].5[illegible]), the so-called Theokoleon, the rotes at Dunaiet. (Vergunen), [illegible]

Sea and river baths for invigoration, were too baths for

*Note 2. Koldewey. p. 46.*

The former gymnasiums in Ephesus and Alexandria-Troas are therefore to be considered as baths and as intermediate betweeen Assos and the Roman imperial Baths. This indeed seems the more credible, since a difference is scarcely to be found between the gymnasion and the baths, and the belief further prevails, that we must see in the imperial baths an amalgamation of the native Italian baths with the arrangement of the palestra of the gymnasion or of the gymnasion itself.

No Grecian city can be conceived without a gymnasion; larger cities could exhibit several of them. With the progressive and general development of physical exercises, and with the custom of the men to take an active part in the sports of the youths, and to devote a portion of their free time to this, it became a necessity of Grecian life.

The lower Gymnasion at Priene consisted of a great court surrounded by columns, that on two sides showed only plain walls as enclosures; on the third side lay three small rooms and a propyleion with antes; on the fourth side was an added second portico, behind which lay five rooms. The connecting doorway toward the Stadion lay within one colonnade, that had no rooms behind it. (Fig. 436).

The Gymnasion at Delphi had a columnar portico 656 ft. long and an arrangement of baths. That at Epidauros was distinguished by its beautiful plan and the good proportions of its masses. The double portico recalls that of the Gymnasion at Priene; of good effect are the two-aisled hall and the splendidly built propyleion on four columns and the ascending ramp. Seats, lecture hall and stone benches for the pupils are yet preserved and peculiarly impress the visitor. Fig. 441 gives an idea of the plan, after Kabbadias, with my sketch of the arrangement of the school in Fig. 442.

There are further to be mentioned:-- the Gymnasion in Eretria (Jour. of Archaeol. XI. 1896. I Series. 153), the circular building in Olympia (text volume II. p. 105, Figs. 59,60), the so-called Theokoleon, the Baths at Oiniadai. (Marquand, Greek Archatecture. p. 327. New York. 1909.

Sea and river baths for invigoration, warm tub baths for

cleanliness, were already mentioned by Homer. With increasing luxury, the custom of warm bathing became more widely extended; bath rooms were arranged in the private houses, and "balnearia" were built for the great public, either kept by the state or by private speculators, in which visitors bathed together in great basins, employiyg sprinklers and basins of all kinds for pouring on the water etc. Figs. 443 [1] and 444 represent these baths after the vase paintings, one for men and the other for women, in which sprinklers and pouring are to be recognized. A partially preserved room in the Athenian Dipylon for washing the feet still afords a vivid representation. Otherwise little has become known of the architectural arrangements of Grecian baths. That in Assos is the only larger Greek bath certain at this time. [2] This shows as the chief apartment a portico about 16.4 ft. wide and 223 ft. long, in which stood the great basin for water, whose bases were found. This was only intended for washing, pouring and sprinkling, as represented on the vase paintings.

*Note 1. Reproduced from Baumeister. Vol. I. p. 242, 243.*

*Note 2. According to Koldewey in Mitt. d. Kais. Deutsch A Arch. Inst. Athen. Abt. Vol. IX. p. 44, 46. Athens. 1884.*

DIVISION XII. MARKET-PLACES, STOAS, BULEUTERIONS, PRYTANEIONS AND LESCHES.

Agora and Stoa. For the earnest business assembly of the men served the market or agora. This was originally no arbitrarily chosen place in the city, but was the natural centre of the locality, "a conveniently placed depression in which different ways met." Such a market-place might under some circumstances become the nucleus of a growing district, [3] as may be observed in all modern settelments. From the scattered farms and farmsteads, men came together for purchase and exchange on a neutral ground; thus arose those stores of goods, places for refreshment, inns, shops etc. Goods and men required protection from the weather, wind and sun; the portable, simple tents and booths became fixed huts and houses, t the first period of a city community. The originally scarcely fenced, leveled and perhaps paved place, for whose consecration were provided sancturaries, was gradually surrounded by business houses, porticos, and administrative buildings, and was adorned by monuments.

*Note 3. See Curtius, E. Ueber Märkte Hellenischen Städte. Arch. Zeit. 1848.*

The Greeks arranged their market-places in square form with spacious and doubled porticos; they decorated these by closely set columns and stone or marble beams and placed passages above the ceilings, writes Vitruvius (Book V, 1-1); and Pausanias likewise says concerning the market in Elis, that it consisted of separate porticos intersected by streets, the southern being built in the Doric style and divided in three parts by colonnades. One of the Market-halls in Megalopolis was the "Myriopolis", another was called "Aristandreion" after its builder, and a third was the "Philippic", adjoining which was a fourth and smaller one, in which were arranged s six rooms for administrative purposes. In the midst of this market was a walled sacred precinct, before which stood a bronze statue of Apollo 12 ft. high. In Argos, the Sanctuary of Athena Salpinx , a structure of white marble, was placed in the middle of the market; the centre in Pharae was decorated by the stone statue of a bearded Hermes; in Antikyra was

[illegible] in Ionic capitals.

Like an increasing assemblage of people in large cities, one of the original commerce of the market was dropped, and a secondary one was chosen for the business and discussion of public concerns. (Compare Athens and Megalopolis, where there was [illegible] in an assembly).

[illegible] became the scene of great activity in arts. To the porticos were added aqueducts, groves of trees, as well as exhibits of art works. In either of later growth, the earlier accidental and irregular plan of the market-place was abandoned, and this was a part of the plan of the city in accordance with a definite design.

According to Vitruvius (Book VI, 7), it appears that it was the Romans, who introduced the improvement: "the Market-place in Fora is not arranged according to the Greek plan, as the market-places in Ionia and the neighbouring Greek cities, but in one other style".

The reading of Tyrian merchants, lawyers exhibit a resemblance of market-places in the Grecian modern country; in Syracuse, in medieval colony in a cultivated field marks the Agora, once so populous, most [illegible] are allotted by some citizens in the islands and the coasts of Asia Minor.

The Market-place in Agora (see the perspective section by E. Foss in book volume 4, page 89, of the Vitruvian Plan, from which the fig. was taken) still appears as an extensive sanctuary surrounded of three stories, 50.10 ft. long and 89.4 ft. wide, with a transverse wing 88.60 ft. long. Two of the stories lay beneath the pavement of the terrace on which the building stood, longitudinal walk and transverses walls at distances of 14.1 ft. subdivided the lower stories into small and nearly square rooms with doors and windows, above which was closed the two-storied portico, opening in front. [1] The connection of this Market-place with that in Pergamon exhibits a striking correspondence of one two. A third quite similar and tolerably preserved Greek

a fountain-housa supported by columns. The Eleans also sode horses in their market-place.

With an increasing assemblage of people in large cities, one of the original purposes of the market was dropped, and a special place was chosen for the treatment and discussion of public occasions. (Compare Athens and Megalopolis, where there was a special, council hall, the Thersilion, that accommodated 10,000 Arcadians in an assembly.

Everywhere that a democratic state developed freely, the market-place became the scene of great activity in art. To the porticos were added aqueducts, groves of trees, as well as exhibits of art works. In cities of later growth, the earlier accidental and irregular plan of the market-place was abandoned, and this was made a part of the plan of the city in accordance with a definite scheme.

According to Pausanias (Book VI, 24), it appears that it was the Ionians, who introduced the improvement; "the Market-place in Elis is not arranged according to the same plan, as the mar ket-places in Ionia and the neighboring Greek cities, but in the older style".

The remains of Ionian market-places exhibit a rectangular or square arena surrounded by porticos. Nothing longer remains of market-places in the Grecian mother country; in Syracuse, an unfluted column in a cultivated field marks the Agora, once so magnificent, more data are afforded are afforded by some cities in the islands and the cities of Asia Minor.

The Market-place in Aegae Ssee the perspective section by R. Bohn in text volume 4, page 39, of the Pergamon Work, from which Fig. 445 is taken) still appears as an extensive ashlar structure of three stories, 270.17 ft. long and 37.5 ft. wide, with a transverse wing 88.56 ft. long. Two of the stories lay beneath the pavement of the terrace on which the building stood, while the third rested thereon as an isolated structure. One longitudinal wall and transverse walls at distances of 14.1 ft. subdivided the lower stories into small and nearly square rooms with doors and windows, above which was placed the two-aisled portico, opening in front. [1] The comparison of this Market-place with that in Pergamon exhibits a striking concurrence of the two. A third quite similar and tolerably preserved design

The Propylaea [illegible] drew further conclusions relative to the [illegible], which is usually designated as appertaining to the approach Altars. In Agoraeraies about four double porticos, each were internally decorated by columns of the Ionic order, and in number; Doric seats invited one to rest.

Note 1. Comments Ross & Schinkewitz, p. 18 -22, Plate. 72, 73.

Note 2. In Vogel's Reconstructions etc. Tab. 2. Plan. 4, C. Plate. 1-12.

[illegible]

The City Market-place and the State Market-place in Pergamon lay on terraces surrounded by porticos, connected by ramps and flights of steps.

The Market-place of the upper city was enclosed by small porticos, before which was placed a portico. (See Pergamon Band, Vol. III, pl. 32).

Besides the porticos belonging to the market-places or to one of furnishing the people with covered and shady promenade and public halls for decorative streets or squares, also small [illegible] was generally raised a few steps above the pavement of the street.

The oldest were of no great length, enclosed on one side by a wall, with the colonnade toward the street, above which extended the colonnad entablature, like the dwelling-rooms of the temple, furnished with a stoop or a wooden ceiling, which was again protected by a roof.

[illegible] of which was turned toward the market-place, but the other had (which was generally the case), not a wall, to these accord of the temple. (Compare Pausanias. VI, 20).

The Portico in Porticos corresponded to what Pausanias tells as usual, so that one should be considered as a rule.

The southern Portico of the Hellenistics on the Market-place in Elis was divided in three parts by (two) colonnades in [illegible] was a Portico with five colonnades; the Stoa of Attalos

of this kind at Demirdji-Deressi in Caria is published by Le Bas. [2] Fabricius [3] gives further conclusions relating to the latter, which is usually designated as appertaining to the antique Alinda. In Aphrodisias stood four double porticos, that were internally decorated by columns of the Ionic order, 460 in number; marble seats invited one to rest.

*Note 1. Compare Bohn & Schuchardt, p. 15 -27, Figs. 13.26.*

*Note 2. In Voyage Archaeologique etc. Vol. 2. Plas. 4, 5. Paris. 1848.*

*Note 3. In Bohn & Schuchardt. P. 27-30.*

The City Market-place and the State Market-place in Pergamon lay on terraces surrounded by porticos, connected by ramps and flights of steps.

The Market-place of the upper city was enclosed by small booths, before which was placed a portico.(See Pergamon Work, Vol. III, pl. 32).

Besides the porticos belonging to the market-places or to the theatres, others likewise occur, that only have the purpose of furnishing the people with covered and shady promenades and public walks for decorating streets or squares, also employed for consultations, addresses or readings, the Stoa, which was generally raised a few steps above the pavement of the street.

The oldest were of no great depth, enclosed on one side by a wall, with the colonnade toward the street, above which extended the horizontal entablature, like the described stoas of the temple, furnished with a stone or a wooden ceiling, which was again protected by a shed roof.

Thus the Corcyrian portico in Elis had two colonnades, one of which was turned toward the market-place, but the other was twrned from it. In the midst between both, columns do not extend (which was generally the case), but a wall, to there support the ridge of the roof". It was also covered by the gable roof of the temple.(Compare Pausanias. VI, 24).

The Portico in Thoricos corresponded to what Pausanias held as usual, so that this should be considered as a Stoa.

The southern Portico of the Hellanodices on the Market-place in Elis was divided in three parts by (two) colonnades; in Piraeus was a Portico with five colonnades; the Stoa of Attalos

to Athens (Fig. 44? a, plan according to Vitruvius), and along the near wall a large number of small rooms for shops or accommodation, just as on the Agora in Antioch-[illegible] Allen and Delaney. Diversion in Athens was found a little near the Bouleuterion. The auditoriums of the Athenians there in the echeion of 1[illegible] provided to light before the Dionysos the ruins of a Hellenistic long corridor 38.0 ft. long, whose capitals were with those appropriated in Erg. Eom: volute capitals with bull heads produced from [illegible]. In the most beautiful manner are these remarkable [illegible] and accompanied by F. Wilberg in the Jahrb. [illegible] 1[illegible]. 1[illegible] 6 is a very interesting example of an Ionic [illegible] Iron use and of the 1 as centuries B.C.), in which the architect is made "to adjusts by novelties the conventional forms of architecture." The axial distances of the columns in 16.6 ft. and their height may be taken at 30.0 ft. The Stoa of Attalos was in two stories, according to "[illegible]" architecture.

The inscription on the architrave, it was founded by Attalos II of Pergamon (159-138 B.C.), and it formed a very long [illegible] 38'. 0 in. long and 68.25 ft. wide. A colonnade divided the lower story of the portico into two aisles, while the upper was [illegible] in a single aisle. The lower portico opened on the side of the [illegible] and of Doric columns supported the upper story, while the roof rested on 22 pilaster columns decorated in full [illegible]. Fig. 44?, 44? ). The pedestal of the ancient entrance of the Stoa of Attalos is at least 1.[illegible] ft. lower than the equivalent of the [illegible] the [illegible] wall of the latter, was therefore built as a [illegible] wall and was always visible. Otherwise not have led to the high raised place before the portico. [2] Pausanias also mentions such stoas in Pergamon and two [illegible] before the gates in Athens leading to the Ceramicus; also in the Peraeus [illegible], the royal Portico, "where the king met in Judgment, i.e., one of the archons, who for a year was entitled with the office, which was termed kingly". For this reason [1] [illegible] stepped to make the form of the [illegible], this [illegible] a three-aisled plan with raised central aisle. In rela-

in Athens (Fig. 446 a, plan according to Mylonas), had along the rear wall a large number of small rooms for shops or money-changers, just as at the Agora in Antiphellos.(See Adler and Texier). Likewise in Ephesos was found a Stoa near the Odeion. The excavations of the Austrians there in the autumn of 1908 brought to light before the Odeion the ruins of a Hellenistic Ionic portico 22.0 ft. long, whose capitals agree with those represented in Fig. 282; volute capitals with bull heads projecting from bolsters. In the most beautiful manner are these results collected and reproduced by W. Wilberg in the Jahrb. d. Oest. Arch. Inst, Vol. 12, 1909. After these, the corresponding Fig. 446 b is a very interesting example of an Ionic portico from the end of the 1 st century B.C., in which the attempt is made "to animate by novelties the traditional forms of architecture." The axial distances of the columns is 15.8 ft. and their height may be taken at 23.0 ft. The Stoa of Attalos was in two stories, according to Vitruvius' statements, the lower with Doric and the upper with Ionic colonnades. From the inscription on the architrave, it was founded by Attalos II of Pergamon (159-138 B.C.), and it formed a very long structure 367.36 ft. long and 63.96 ft. wide. A colonnade divided the lower story of the portico into two aisles, while the upper was constructed in a single aisle. The lower portico opened on the side of the Market-place and 45 Doric columns supported the upper story, while the roof rested on 22 unfluted columns decorated by bell capitals. (Figs. 447, 448 [1] ). The height of the ancient balustrade of the Stoa of Attalos is at l least 19.68 ft. lower than the stylobate of this portico; the northern wall of the latter was therefore built as a high retaining wall and was always visible. Stairways must have led up to the high raised place before the portico. [2] Pausanias a also mentions such stoas in Piraeus and two porticos before t the gates in Athens leading to the Keramicos; also in the Ceramicos itself, the royal Portico, "where the king sat in judgement, i.e., one of the archons, who for a year was colthed with the office, which was termed kingly". For this Lange [1] has attempted to make the form of the basilica credible, this being a three-aisled plan with raised central aisle. In refe-

References to the Stoa in Guidebooks, see the sources mentioned below, [illegible], and concerning the Portico in Pergamon, see the work cited below.

Note 1. Dragore Zeit. f. Bau. 1888. Pls. [illegible]. [illegible] Fig. [illegible].

Note 2. See Mitt. d. Kais. Deutschen. Arch. Inst. Athn. Abt. [illegible]. XVI. p. [illegible]. Athens. 1891.

Note 1. In Bau und Baile etc. Berlin. 1890. p. 88-104.

Note 2. [illegible] see [illegible] p. [illegible]

Note 3. [illegible]

Before the period frequently used columns stations of brown and white marble (colonne bicrome): the walls in the interior were in some cases decorated by historical paintings; upon a Stoa on the Athenian Acropolis with such process was called the "Early colored" (poikile).

One of the Stoas may have been that in Sparta known by the [illegible] and in course of time was enlarged and embellished: on its porticus stood Persians in white marble, among them being the "statues of Mardonius.

The length of these porticos was usually great, as shown by the advertisement of the Stoa of Attalos between the Theatre of Dionysos and the Odeon on the southern slope of the Acropolis in Athens. The latter was over 450 ft. long, and the former had a length almost twice as great.

By the excavations of the Archaeological Society in Athens in 1877, the Portico was proved to be 364.6 ft. long in two [illegible] and also the square intercolumn bases of the inner row of pillars below a base slab of Pyrenean marble.

Note 1. Dumrese Theln - A Ziffer. Mitt. d. Kais. Deutsch. Inst. Arch. Abt. Ath. XIV. p. 147, ff. Athens. 1877.

In two aisles and probably in two stories in also the Portico mentioned in Guidebooks, in which the free pillars in the ground story have octagonal sections with acanthus-like projecting capitals to receive pillars and entablature.

reference to the Stoa in Epidauros, see the sources mentioned below, [2], and concerning the Portico in Pergamon, see the work cited below. [3]

*Note 1. Compare Zeit. f. Bauw. 1882. Pls. 52, 53; also Fig. 243.*

*Note 2. See Mitt. d. Kais. Deutsch. Arch. Inst. Ath. Abt. Vol. XVI. p. 252. Athens. 1891.*

*Note 1. In Haus und Halle etc. Leipzig. 1885. p. 66-104.*

*Note 2. Praktika. 1885. Pls. 1, 2.*

*Note 3. Altartümer von pergamon etc. Vol. II. p. 40. Berlin. 1885.*

Before the portico frequently stood bronze statues of famous men and women (compare Athens); the walls in the interior were in some cases decorated by historical paintings; such a Stoa on the Athenian Market-place with such pictures was called the "gayly colored" (poikile).

One of the finest may have been that in Sparta known by the name of "Persian Portico", "which was built with Median booty, and in course of time was enlarged and beautified; on its columns stood Persians in white marble, among them being the statue of Mardonius.

The length of these porticos was usually great, as shown by the substructure of the Stoa of Eumenes between the Theatre of Dionysos and the Odeon on the southern slope of the Acropolis in Athens. The latter was over 328 ft. long, and the formed had a length almost twice as great.

By the excavations of the Archaeological Society in Athens in 1877, the Portico was proved to be 534.64 ft. long in two aisles and 52.48 ft. in width. A large portion of the limestone foundations of the external longer side are preserved, and also the square limestone bases of the inner row of pillars and portions of the rear and side walls, around which extended below a base slab of Hymettos marble. [1]

*Note 1. Compare Köhler & Zitter. Mitt. d. Kais. Deutsch Arch. Inst. Ath. Abt. Vol. III, p. 147, pl. 7. Athens. 1877.*

In two aisles and partially in two stories is also the Portico mentioned in Epidauros, in which the free pillars in the ground story have octagonal sections with echinus-like projecting capitals to receive pillars and entablature.

The Agora or Market-place in Priene was enclosed by colonnaded porticoes on the east, south and west, that isolated an area of [illegible] ft. The excavation (Priene Text, p. [illegible]), according to Koepper, so unusual is the condition of preservation, has given us the first distinct view of a Greek and richly treated weatherable clay masonry. The architecture of the porticos belongs to the Doric order. The bases of the columns average 1'4.0 to 1'6.7 ft., and most of the rooms in the exterior and western porticos, from which they are alone accessible, a average about 15.75 ft.

The southern portico of the Market exhibits this marble wall 7.1 ft. high between the columns, that also have affected the [illegible] in columns in the interior, that aid in supporting the ceiling and roof. A low promenade is not placed before this. An example of the Ionic columns with unlike volutes was formerly in the Pergamon Museum in Berlin. (Fig. 20 p. 128 of the Text). According to the evidence of an inscription, this two-sided portico served as a state place for "grand business in connection with the city festivals". (See ground plan of the market in Fig. 224, other Plate 2 of the Ionic Text).

The Agora in Kaunos (Publication of the Ogul Tosemian Museum by Hussey, Korte and Heinrich, Berlin, 1904) was occupied in size the designs in Miletos, Aphrodisias, Priene and Priene, and it only possess interior to such in Miletos. It measured 300 ft. between the front columns, or 212 x 318 or 272 ft. The plan on Plate 5 of the Kaunos Work is similar to those of the cities already mentioned -- Doric order on the external facades, Ionic in the interior, the latter arrangement [illegible] the wall with a gable on the front with 4 windows, that had [illegible] 117 on page 118 of the work). Notable is also an antaxis analogue, a marble Nike in life size, that supported the end of the cella curtain, and an Ionic capital there, that was decorated by bull heads on the side helstens. The Agora was in[illegible] also ornamented by statues, resting pieces, foundations, and yet other architectural works, that served for general pur-

The Agora or Market-place in Priene was enclosed by connected porticos on the east, south and west, that included an area of 247 × 152 ft. The excavation (Priene Werk, p. 185), according to Schrader, so unusual is the condition of preservation, has given us the first distinct view of a great and richly treated Hellenistic city market. The architecture of the porticos belongs to the Doric order. The depth of the portocos averages 19.0 to 19.7 ft., and that of most of the rooms in the eastern and western porticos, from which they are alone accessible, a averages about 15.75 ft.

The southern portico of the Market exhibits thin marble walls 8.1 ft. high between the columns, that must have afforded protection against northern winds. The northern portico has Ionic columns in the interior, that aid in supporting the ceiling and roof. A low promenade is not placed before this. An example of the Ionic columns with unlike volutes was formerly in the Pergamon Museum in Berlin.(Fig. on p. 199 of the Werk). According to the evidence of an inscription, this two-aisled portico served as a state place for "grand banquets in connection with the city festivals".(See ground plan of the Market in Fig. 204, after Plate 2 of the Priene Werk).

The Agora in Magnesia-a-M (Publication of the Royal Prussian Museum by Humann, Kohte and Walzinger. Berlin. 1904),exceeded in size the designs in Cnidos, Aphrodisias, Pergamon and Priene, and it only remains inferior to that in Miletus.[2] It measured 325 ft. between the front columns, or 312 × 618 or 617 ft. The plan on Plate 3 of the Magnesia Work is similar to those of the cities already mentioned:-- Doric order on the external facades, Ionic in the interior, the latter supporting the ridge of the roof. The western portico had an enclosing wall with a gable on the front with 4 windows, that had wooden closures, adjoining the wall being a spring-house. (Fig. 117 on page 112 of the work). Notable is also an esthetic sculpture, a marble Nike in life size, that supported the end of the ridge purlin, and an Ionic capital there, that was decorated by bull heads on the side bolsters. The Market was indeed also ornamented by statues, resting places, fountains, and yet other architectural works, that served for general pur-

purposes, as the example for weather-indicators and sundials, of which may be mentioned the so-called Tower of the Winds or more correctly the Horologion of Andronicos Cyrrhestes from Athens. It was designed to support a weather vane and to receive a sundial and water-clock. It is an octagonal building of average height and with an internal diameter of 24.5 ft., that on the northeast and northwest had porches with two columns, adorned by pediments, toward the south being an angular semicircular projection. The eight sides of the building are directed toward the principal winds, and on each side above the crowning moulding of the wall is carved a soaring figure, built in very medioore work represente the wind corresponding to that side. The heads and wings of these figures are composed of several slabs and intersect in an awkward manner the architrave moulding. The apex of the roof is ornamented by a movable triton, who indicates with a staff the direction of the prevailing wind.

The lines for the sundial still remain, but below the pediments. The cornice is skimpy and rude in form, and the apex is ornamented on each side by three lions' heads.

A channel conducted the water from the south Cherubim to the circular projection, that contained the water reservoir. The vestiges of the water clock are still visible on the floor. Inside this monument are still remaining the arches made of 3 ashlars, which were formerly regarded as belonging to an aqueduct to the little building, but which according to later researches are not built of voussoirs; the small span and the weight of which they are constructed, consisted in great blocks, indeed certainly the original of the canal construction of the arch. They are cut from rectangular blocks of stone, yet not in a complete semicircle; with plain soffit and decorated by archivolts profiles so like an architrave; a rosette adorns the keystone, a motive that Ionians loved to use in the Renaissance. Above there a cornice were an architrave and a cornice, portions of which yet remain in place.[1]

purposes, as the example for weather indicators and sundials, of which may be mentioned the so-called Tower of the Winds or more correctly the Horologium of Andronicos Cyrrhestes from Cyrrhos in Syria, built of Pentelican marble about 100 B.C. in Athens. It was designed to support a weather vane anf to receive a sundial and water-clock. It is an octagonal building of average height and with an internal diameter of 23.0 ft., that on the northeast and northwest had porches with two columns, adorned by pediments, toward the south being an apsidal semicircular projection. The eight sides of the building are directed toward the principal winds, and on each side above the crowning moulding of the wall is carved a soaring figure, that in very mediocre work represents the wind corresponding to that side. The heads and wings of these figures are composed of several slabs and intersect in an awkward manner the architrave mouldings. The apex of the roof is ornamented by a movable triton, who indicates with a staff the direction of the prevailing wind.

The lines for the sundial still remain, cut below the reliefs. The cornice is stumpy and rude in form, and the cyma is ornamented on each side by three lions' heads.

A channel conducted the water from the spring Clepsydra to the circular projection, that contained the water reservoir. The vestiges of the water clock are still visible on the floor. Beside this monument are still remaining the arches made of a ashlars, which were formerly regarded as belonging to an aqueduct to the little building, but which according to later researches, belonged to a separate structure. The arches are not built of voussoirs; the small span and the marble of which they are constructed, quarried in great blocks, indeed permit the omission of the usual construction of the arch. They are cut from rectangular blocks of stone, yet not in a complete semicircle; with plain soffit and decorated by archivolts profiled like an architrave; a rosette adorns the spandrel, a motive that Bramante loved to use in the Renaissance. Above these a arches were an architrave and a cornice, portions of which yet remain in place.[1]

*Note 1. On various pieces belonging to this, the remains of inscriptions have been found, which refer this building to the*

The piers are treated in a peculiar manner, for on the front surface and in accordance with the accepted practice thereon, an ornamental subdivision is arranged at their centres. Here the sides are no longer parallel but diverge: the separating portion is cut with a broken surface in order to make possible an interpenetration of the returned profile of the cap of the pier. (Fig. 450).

The interior is subdivided in its height by two richly profiled cornices (Fig. 451), a plain band course supporting the upper columns at the angles, and an architrave band above this: the ceiling is composed of 24 inclined stone slabs, that lean against a central block. Columns and antes at the entrances have no bases; but the enclosing wall has one, consisting of mouldings, fillet and torus. The antes are not connected with the masonry, but are set against it: the capitals of the antes should in their remains the same, or a form allied to that of the capitals of the columns, a row of acanthus leaves with each leaves extending from them to the top of the wall. The extension of both is made in conjunction with similar capitals found at the Theatre of Dionysos. The shafts of the columns are fluted, but those of the antes are plain. Only a short portion of an ante still stands, as well as two portions of the shafts of columns extending to the height of a man; the jambs of the doorways still remain, but the capitals, architrave, cornice, and the pediments of the porticos are entirely detached from the building and are in great part destroyed.

The walls are built in courses of marble cubes 1.27 ft. thick and of various heights, and are still in good preservation, with the exception of some cracks. The setting bosses left in the flutes of the columns have already been shown. The architrave and friezes of the porticos are bonded into the wall; the pediment merely abutted against it. How far iron was employed in this fixing can no longer be determined in the present condition of the monument. Two steps of the stylobate are still

*imperial period, soon after Augustus. See Dessau. Mitt. d. Kais. Deutsch Arch. Inst. Ath. Abt. Vol. 7. p. 398-400. Athens. 1882.*

The piers are treated in a peculiar manner, for on the front surface and in accordance with the archivolt resting thereon, an ornamental subdivision is arranged at their centres. Here the sides are no longer parallel but diverge; the separating portion is cut with a broken surface in order to make possible an intersection of the returned profile of the cap of the pier. (Fig. 450).

The interior is subdivided in its height by two richly profiled cornices (Fig. 451), a plain band course supporting the upper columns at the angles, and an architrave band above this; the ceiling is composed of 24 inclined stone slabs, that lean against a central block. Columns and antes at the entrances have no bases; but the enclosing wall has one, consisting of apophyge, fillet and torus. The antes are not connected with the masonry, but are set against it; the capitals of the antes exhibit in their remains the same, or a form allied to that of the capitals of the columns, a row of acanthus leaves with sedge leaves extending from them to the top of the bell. The execution of both is rude in comparison with similar capitals found at the Theatre of Dionysos. The shafts of the columns are fluted, but those of the antes are plain. Only a short portion of an ante still stands, as well as two portions of the shafts of columns extending to the height of a man; the jambs of the doorways still remain, but the capitals, architrave, cornice, and the pediments of the portals are entirely detached from the building and are in great part destroyed.

The walls are built in courses of marble slabs 1.67 ft. thick and of various heights, and are still in good preservation, with the exception of some cracks. The setting bosses left in the flutes of the columns have already been shown. The architrave and frieze of the portals are bonded into the wall; the pediment merely abutted against it. How far iron was employed in this fixing can no longer be determined in the present condition of the monument. Two steps of the stylobate are still in place and to be seen; the third is covered by the soil.

Fig. 450 gives a part of the internal cornice; Fig.452 is the [illegible] of the external frieze with water spouts.

The Sculpture in Olympia consisted of two oblong halls separated in two aisles by a colonnade in the middle and ending in semicircular room beyond the west. These two wings on the north and south joined a square central structure and a common vestibule of the Ionic order. Each wing rests on a stylobate in two steps, and their ends open with 8 Doric columns between [illegible], whose intercolumns had grilles. Separate doorways led from the aisles to the apse divided into two halves. The internal columns supporting the architrave of the roof were not fluted. (See plan of site of Olympia).

In the south wing, the regulas and mutules remained without drops, and the entablatures were coloured in the usual manner. (Tainiowin blue, metopes blue, [illegible] building the drops are entirely wanting on the mutules, while they have an elongated form on the regulae, and [illegible] triglyphs and are inserted; only 5 drops were suspended.

In the central structure, in which the Agonistes and their followers, as well as the Hellanodicas, had to take the oath dedicated for them, indeed stood the statue of "Zeus Horkios", and this space was therefore uncovered.

The special rooms are explained as treasuries, in which were kept the state funds, which were needed for the administration of the place and the festival. [1]

[illegible]

More light on the peculiarities of these public buildings is obtained by the discoveries in Priene and Miletus, as well as by the publication of the so-called Theatilion (thus named after the Lunaes) in Heliopolis. The latter was a rectangular assembly hall 200 x 171 ft. with stepped seats, and it stood in the immediate vicinity of the Theatre. (Fig. 464).

The plans of the visitors rose in the form of an amphitheatre; those nearest the external walls were therefore only 8.2 ft. higher than those nearest the auditor.

Two smaller and similar assembly halls are still attested

Fig. 450 gives a part of the internal cornice; Fig.452 is the ground plan of the little structure, and Fig. 453 is a portion of the external frieze with water spouts.

The Buleuterion in Olympia consisted of two oblong halls separated in two aisles by a colonnade in the middle and ending in semicircular form toward the west. These two wings on the north and south joined a square central structure and a common vestibule of the Ionic order. Each wing rests on a stylobate in two steps, and their ends open with 3 Doric columns between antes, whose interspaces had grilles. Separate doorways led from the aisles to the apse divided into two halves. The internal columns supporting the structure of the roof were not fluted. (See plan of site of Olympia).

On the south wing, the regulas and mutules remained without drops, and the entablatures were colored in the usual manner. (Triglyphs blue, mutules blue, metopes red). On the northern building the drops are entirely wanting on the mutules, while they have an elongated form on the regulas, are made of marly limestone and are inserted; only 5 drops were suspended.

In the central structure, in which the Agonistes and their followers, as well as the Hellanodices, had to take the oath prescribed for them, indeed stood the Statue of "Zeus Horcheios", and this space was therefore uncovered.

The apsidal rooms are explained as treasuries, in which were kept the state funds, which were needed for the anministration of the place and the festival. [1]

*Note 1. See Ausgrabungen. Vol. 40. Pls. 35, 36; Vol. 5, p. 32.*

More light on the peculiarities of these public buildings is obtained by the discoveries in Priene and Miletus, as well as by the publication of the so-called Thersilion (thus named after the founder) in Megalopolis. The latter was a rectangular assembly hall 200 * 171 ft. with stepped seats, and it stood in the immediate vicinity of the Theatre. (Fig. 454).

The places of the visitors rose in the form of an amphitheatre; those nearest the external walls were therefore only 8.2 ft. higher than those nearest the speaker.

Two smaller and similar assembly halls are still attested

in Greece and Rome.

Beautifully well preserved and entirely distinct from before us the Salutatorium at Priene, with its nearly square ground plan of 38.5 × 39.0 ft. -- a building where the S and E and centuries B.C. The interior was lighted through doorways and windows in the outer walls; the ceiling and roof were supported by the walls and piers. The stone seats and the access to them are still preserved entirely. (Fig. 407 and page 220 in the Priene Work). Its arrangement is allied to that of a theatre; in the middle is a square area with an altar, from which the marble seats rise on three sides, ending with oblique walls near the fourth side. The rear wall exhibits a recession or niche on the right and left of which is a doorway. The span of the ceiling is 42.7 ft., measured between the posts, this being reduced to 35.0 ft. by later restoration. The conclusion is reached, that the building served for both the "Boule" and the "Prytaneis".

Dr Bresker relies on account of the architectural design and treatment in the Prytaneion at Miletus, consisting of a prostylion adorned by columns, a court surrounded on three sides by columns, at the centre of which rose a richly treated tomb of a hero. (Fig. 408). Four doorways led from the court and a [illegible] the ceiling and roof being borne by strong external walls and by four isolated supports (columns), that were 44.3 ft. from centre to centre, thus similarly disposed as in the line building in Priene.[1] (See second plan according to the Publication of the Royal Museum in Berlin; Miet. Pieneu. der Berliner Museen und Ausgrabungen seit dem Jahre 1904. Das Prytaneion von Milet, von Robert Koldewey, Berlin, 1908).

Note 1. The date of the building is referred to the years between 175 and 164 B.C., and it also noted, that Sulpicius had the Council Hall in Antioch built on the same plan as that in Miletus -- or the reverse.

Fig. 3 in the Work gives a true representation of the present condition of the interior, according to which the marble seats are still well preserved and are in place. The corresponding proportion has columns and antes of the Corinthian or-

in Eleusis and Lusoi.

Relatively well preserved and entirely distinct lies before us the Buleuterion at Priene, with its nearly square ground plan of 65.6 × 69.0 ft. -- a buildingfrom the 2 nd and 3 rd centuries B.C. The interior was lighted through doorways and windows in the outer walls; the ceiling and roof were supported by the walls and piers. The stone seats and the access to them are still preserved entirely. (Figs. 457 and page 223 in the Priene Work). Its arrangement is allied to that of a theatre; in the middle is a square area with an altar, from which the marble seats rise on three sides, ending with oblique walls next the fourth side. The rear wall exhibits a rectangular niche on the right and left of which is a doorway. The span of the ceiling is 47.7 ft., measured between the posts, this being reduced to 35.0 ft. by later repairs. The conjecture is expressed, that the building served for both the "boule" and the "ecclesia".

Of greater value on account of its architectural design and treatment is the Buleuterion at Miletus, consisting of a propyleion adorned by columns, a court surrounded on three sides by columns, at the centre of which rose a richly treated tomb of a hero.(Fig. 458). Four doorways led from the court and p portico into the council hall, whose seats rose in semicircular form, its ceiling and roof being borne by strong external walls and by four isolated supports (columns), that were 44.3 ft. f from centre to centre, thus similarly distant as in the like building in Priene. [1] (See ground plan according to the Publication of the Royal Museum in Berlin; Milet, Ergebnisse der Ausgrabungen und Untersuchungen seit dem Jahre 1891. Das Rathaus von Milet, von Hubert Knackfuss. Berlin. 1908).

*Note 1. The date of the building is referred to the years between 175 and 164 B.C., and it also noted, that Epiphanes had the Council Hall in Antiochia built on the same plan as that in Miletus -- or the reverse.*

Fig. 6 in the Work gives a fine representation of the present condition of the interior, according to which the marble seats are still well preserved and are in place. The corresponding propyleion has columns and antes of the Corinthian or-

owner of Immutat Beauty. The nail columns of the hall exhibit Tower Doric capitals with carved egg-and-dart mouldings on the echinus, the shafts are fluted, the sandstone of the triglyphs show a lake floor, the entrances of the walls are ornamented by Kiln round cones; shields carved on the stones, and in the interior by pilasters. Instead of half round columns, half square piers occur at the external angles.

The four columns supporting the ceiling and roof were of the Ionic order, the roof being a gable roof with plain cornices, above the triglyphs were dentils, the eaves being ornamented by sculptured palm leaves, scrolls and lions' heads.

The foundations of a building in Delphi, termed a Bulentarion, enclose the ground area of a rectangular interior 16.4 x 8.4 ft. or 640.25 sq. ft. The entrance is assumed at one end. Therefore this Council Hall was but half as large as the Conservation Hall of the Gadrians in Delphi, and it would afford space for about 70 seats.

Samania takes pleasure in mentioning them in this or that [illegible] in Sparta about beside other magnificent buildings on the Market-place, and that the Samnis or council of the elders and tribunes, would be only seated in the decoration of Athens, that near the Council Hall of the Five Hundred (Pritanes chosen by lot, of which for 35 or 36 days, 50 men had charge of a public affairs and composed the preliminary court of the public assembly) was the so-called round building, in which the Prytanes offered sacrifice. Concerning the Council Hall in Elis, the passages relating thereto have been given in connection with the excavation, and in these concerning that in Megalopolis, with the Tegeat-place.

Samania states concerning the Prytaneion, that it was placed within the Altis in Olympia, that an altar of Hermis stood before the doorway, with a hearth in the internal arrangement, on which a fire always burned both day and night.

The Prytaneion in Olympia appears in the excavations as a rectangular peristyle structure, much subdivided by rooms of different periods.

The Prytaneion was originally in such Greeks city the House of the Princes, the chief officials, in which was the Sanctu-

order of doubtful beauty. The half columns of the hall exhibit Roman Doric capitals with carved egg-and-dart mouldings on the echinus, the shafts are fluted, the endings of the triglyphs show a late form, the exteriors of the walls are ornamented by flat round bossy shields carved on the stones, and in t the interior by pilasters. Instead of half round columns, bold square piers occur at the external angles.

The four columns supporting the ceiling and roof were of the Ionic order, the roof being a gable roof with plain pediments. Above the triglyphs were dentils, the cyma being ornamented by sculptured palm leaves, scrolls and lions' heads.

The foundations of a building in Delphi, termed a buleuterion, enclose the ground area of a rectangular interior 16.4 × 39.4 ft. or 645.86 sq. ft. The entrance is assumed at one end. Therefore this Council Hall was but half as large as the Conversation Hall of the Cnidians in Delphi, and it would afford space for about 70 seats.

Pausanias takes pleasure in mentioning them in this or that place (Elis, Sparta, Athens etc.). He relates that the Council Hall in Sparta stood beside other magistracy buildings on the Market-place, and that the Gerusia or council of the elders met therein, while he only states in the description of Athens, that near the Council Hall of the five hundred (citizens chosen by lot, of which for 35 or 36 days, 50 men had charge of p public affairs and composed the preliminary court of the public assembly) was the so-called round building, in which the Prytanes offered sacrifice. Concerning the Council Hall in Elis, the passages relating thereto have been given in connection with the gymnasion, and in those concerning that in Megalopolis, with the Market-place.

Pausanias states concerning the Prytaneion, that it was placed within the Altis in Olympia, that an altar of Artemis stood before its doorway, with a hearth in its internal apartment, on which a fire always burned both day and night.

The Prytaneion in Olympia appears in the excavations as a s spacious rectangular structure, much subdivided by masonry of different periods.

The Prytaneion was originally in each Grecian city the House of the Prytanes, the chief officials, in which was the Sanctu-

Sacrosancty of Ecclia, the sacred hearth of the state. Upon ocasions, the colonists celebrated with them the sacred fire to the new settlements as a symbol of continual union. In Athens, a north of the Areopolis, was for a time the seat of government, the laws of Solon were written in it, and statues of Eirene [illegible]

Here Athenians observed the public meals of the Prytanes and the distinguished citizens during their lives, in which envoys and guests of the state also participated.

The Prytaneion [illegible] fig. 400 after that referenced on page 204 of the Greene book, consisted of a paved square court with sides of 46.0 ft. with a portico around this, adjoining it being two elongated, three longer and three smaller rooms. The item and size of the area 27.7 × 70.8 ft. corresponds to all medium sized houses in Greece.

Public buildings for the [illegible] of [illegible] where partaker food nor drink was ancilled (like those still in the north, for example in Sicily, but only in the form of large" rooms) were usual, and these were the Sessions or Conversation parts. We may conceive them as having been built like courts or porticos, rich in architectural interiors, since the greatest artists did not disdain to adorn their interiors by paintings, like polycrocos in Delphi. Pausanias describes seven apartments in the Prytaneion at Elis in the [illegible] [illegible] was assembled there in old times to entertain themselves with grave matters as well as with common affairs. The excavations [illegible] × 88.5 ft., and it appears to have been extensively with the simplest architectural treatment. Plain walls with an entrance doorway in the side, with covered porticos inside before the inner walls decorated by paintings, and which surrounded a little court 52.1 × 12.1 ft.= 630.88 sq. ft., that was inclosed turned with consecrated sprays, flowers, and probably with a fountain of water for drinking. A quiet little resting place.

Sanctuary of Hestia, the sacred hearth of the state. From thence, the colonists carried with them the sacred fire to the new settlements as a symbol of continual union. In Athens, n north of the Acropolis, was for a time the seat of government, the laws of Solon were written in it, and statues of Eirene (goddess of peace) were placed therein. (Pausanias, I, 18).

Here likewise occurred the public meals of the Prytanes and the distinguished citizens during their lives, in which envoys and guests of the state also participated.

The Propyleion in Priene, whose ground plan is reproduced in Fig. 459 after that represented on page 223 of the Priene Work, consisted of a paved square court with sides of 23.0 ft. with a portico around this, adjoining it being two elongated , three larger and three smaller rooms. The form and size of the area 57.5 × 78.8 ft. correspond to all medium sized houses in Priene.

Public buildings for the object of pleasant society, where neither food nor drink was supplied (like those still in the South, for example in Sicily, but only in the form of large rooms) were usual, and these were the Lesches or Conversation Halls. We may conceive them as having been built like courts or porticos, rich in architectural interiors, since the greatest artists did not disdain to adorn their interiors by paintings, like Polygnotos in Delphi. Pausanias devotes seven sections of his tenth Book to the description of these paintings, evidence of the importance and prominence in which he held them. Concerning the building, he merely says, that it was founded by the Cnidians and was named "Lesche" by the Delphians, since men assembled there in old times to entertain themselves with grave matters as well as with common affairs. The excavations of the French at Delphi have also brought to light "the slight remains" of this structure. It was of rectangular plan, 26.2 × 52.5 ft., and it appears to have been externally with the simplest architectural treatment. Plain walls with an entrance doorway in the side, with covered porticos inside before the foun walls decorated by paintings, and which surrounded a little court 36.1 × 13.1 ft.= 473.63 sq. ft., that was indeed furnished with ornamental shrubs, flowers, and probably with a fountain of water for drinking. A quiet little resting place.

But whoever wishes to recognize in the little court or flower garden a "place for athletes to exercise", may drop this. Slight traces of painted stucco plastering still remain, as well as four plinths for wooden posts.

That there were many such places of assembly in Greece is to be seen in Homer, where Melanthe scolds Odysseus:--

"That not to sleep, thou goest into the smoky dwelling of the smith,

Or to the public house and there pratest of many things".

Such a Lesche in Sparta was called "gaily colored" on account of the paintings, the same appellation as that for the painted Stoas.

## SECTION VIII. CITIZENS' DWELLINGS, ROYAL, PALACES AND DISPARGES; CITIZENS' DWELLINGS OF THE HISTORICAL PERIOD.

The past period in temples and state buildings, so did it take little part in the development and expansion of the houses in the city. The less interest was devoted to the latter, since the entire thought and customs of the rich and free citizens culminated in the most complete participation in public life. Political activity occupied all men, and none no economical work was attached to the home; it had merely to satisfy the needs of a household; most men only spent time in their own houses for eating and sleeping.

Hence the dwelling of the proprietors, of the political leaders and of the ruler of the people was simple, and in most cases the democratic spirit permitted no prominence of the individual in this respect, the home of the Athenian and of his poor was reduced to a very small measure of architectural treatment. The streets were small and dirty, and men might even be run over by herds of swine in the side alleys of Athens, or these might be polluted after the manner of sloppers in Pompeii, and they were so narrow, that Pisistratus had to lay a tax on the overhanging stories and the doors, that opened outward the streets; thus the houses stretching on them i instead also corresponded to these conditions.

On the western, southwestern and southern slopes of the Acropolis, [illegible] the place where formerly houses stood, perhaps also public buildings and sanctuaries, intermingled with remains of Cyclopean without ornament, set on stone foundations, built of bricks, burned or merely sunbaked, as today is the case in the Aegolic plains. Plans and the subdivision of private houses are unfortunately lost to us; they must have been simple enough indeed, since about 324 B.C. even the city of Athens is described as crowded, dirty and uncomely. The houses of Pisistratus and Miltiades were small and modest -- but the substructures must have been treasted 600 years earlier.

DIVISION XIII. CITIZENS' DWELLINGS, ROYAL PALACES AND LIBRARIES; CITIZENS' DWELLINGS OF THE HISTORICAL PERIOD.

Just as architecture developed harmoniously and nobly during the best period in temples and state buildings, so did it take little part in the development and extension of the House in the city. The less interest was devoted to the latter, since the entire thought and customs of the rich and free citizens culminated in the most complete participation in public life. Political activity occupied all men, and thus no especial worth was attached to the home; it had merely to satisfy the needs of a household; most men only spent time in their own houses for eating and sleeping.

While the dwelling of the prosperous, of the political leader and of the ruler of the people was simple, and in most cases the democratic spirit permitted no prominence of the individual in this respect, the home of the artisan and of the poor was reduced to a very small measure of architectural treatment. The streets were small and dirty, and men might even be run over by herds of swine in the side alleys of Athens,or these might be utilized after the manner of Blepyros in Aristophanes, and they were so narrow, that Hipparchos had to lay a tax on the overhanging stories and the doors, that opened outward toward the street; thus the houses standing on them i indeed also corresponded to these conditions.

On the western, southwestern and southern slopes of the Acropolis of Athens, numerous ruins of Cyclopean foundations, some being of important dimensions (88.6 and 59.1 ft.), mark the places where formerly houses stood, perhaps also public buildings and sanctuaries, intermingled with remains of Cyclopean terrace walls. The houses were certainly treated simply and without ornament, set on strong stone foundations, built of bricks, burned or merely sundried, as today is the case in the Argolic plains. Plans and the subdivision of private houses are unfortunately lost to us; they must have been simple enough indeed, since about 514 B.C. even the city of Athens is described as crowded, dirty and uncomely. The houses of a Themistocles and a Miltiades were small and modest -- but the deficiencies must have been greater 600 years earlier.

ne likewise know of other cities, that they were not built consecutively thus Naqada consisted of five open villages, "not distinguished by temples and costly dwellings, but composed of separate villages according to the Religious mode of building [illegible]."

to the laws of hygiene (240 B.C.), for the construction of ceilings and doors were to be employed no tools other than the axe and the saw. Two kinds, Isotyhnidea and Aegaliea, indeed not without scorn, when as foreign guests in a house, they observed its carefully carved woodwork, asked the question, wh-

The excavation of a small portion of the new city near the Division in Athens shows us a group of small and very poor houses, placed without order and without reference to the course of a street, built of ordinary stones with earth or mortar. Less humble together stood the houses on the rock of Aeropagus, whose plans may still be seen by the levels cut in the rock (fig. 4[illegible]). Neither these nor the later excavations in Magnesia permit a characteristic or typical form of ground plan to be [illegible]

Note 1. Pompeii Tomaneria Area. p. [illegible] pls. 4, 5, 6.

Likewise the plans of the "two rooms" discovered in Priene represent the quarter of the city on the east side of the Rhe. which Fig. 6[illegible] represents, admit of finding no fixed scheme of the plan of a house. The principal facade is on the western side, where a longer street leads, which is intersected by two parallel streets, whose width is 12.04 ft. The walls are strongly built with two faces and are filled with rubble,[2] and they were extensively plastered. The last coat [illegible] colored, sometimes red and veined. Wainscots do not exist or remain. The floor consists only of tamped earth with small c[illegible] islands, which frequently form patterns.[3] In the north-[illegible] which are grouped the rooms. The cities shown see a to have adopted a small sanctuary, and a small garden may have been placed on the terrace.[4]

Note 2. On the use of wooden scarfs in a wall, see notice [illegible]

We likewise know of other cities, that they were not built compactly; thus Sparta consisted of five open villages, "not distinguished by temples and costly designs, but composed of separate villages according to the Hellenic mode of building cities".(Thucydides). The houses were rudely framed; according to the laws of Lycurgus (880 B.C.), for the construction of ceilings and doors were to be employed no tools other than the axe and the saw. Two kings, Leotychides and Agesilaos, indeed not without scorn, when as foreign guests in a house, they observed its carefully carved woodwork, asked the question, whether trees grew square there.

The excavation of a small portion of the new city near the Dipylon in Athens shows us a group of small and very poor houses, placed without order and without reference to the course of a street, built of ordinary stones with earth or mortar.. Less thrown together stood the houses on the rock of Areopagus, whose plans may still be seen by the levels cut in the rock (Fig. 460). Neither these nor the later excavations in Megara permit a characteristic or typical form of ground plan to be recognized. [1]

*Note 1. Compare Ephemeris Arch. p. 22-56; pls. 4, 5, 5. Athens. 1890.*

Likewise the plans of the "two houses" uncovered in Piraeus beneath the quarter of the city on the east side of the Akte, which Fig. 461 represents, admit of finding no fixed scheme of the plan of a house. The principal facade is on the western side, where a longer street leads, which is intersected by two parallel streets, whose width is 18.04 ft. The walls are chiefly built with two faces and are filled with spalls,[2] and they were externally plastered, the last coat being uniformly colored, sometimes red and veined. Thresholds do not exist or remain. The floor consists only of tamped earth with small p pebbles inlaid, which frequently form patterns. [3] In the northern house, a narrow passage leads directly into the court, around which are grouped the rooms. The cippus shown seems to have supported a small sanctuary, and a small garden may have been placed on the terrace. [4]

*Note 2. On the use of wooden courses in a wall, see notice by Dumont in Reva Arch. 1867. II. p. 227.*

Note 3. On plans of houses, see Vollmoller, E. Baukunst etc. [illegible] 1907.

Note 4. See maps of Athens, edited by E. Curtius and J. A. [illegible]

Consequently the regular plan of the houses about 400 B.C., [illegible] remains of Xenocrates's Oikonomikos (Art of Housekeeping) attests some date; "(The house) is not adorned with decorations of all [illegible] But the rooms are built with foresthought, so that they may be apartments most suitable for what is to be in them, and that they may themselves invite tranquility. The sleeping room in [illegible] by ornaments and furniture, the dry rooms to the house for the [illegible], the cold rooms for wine, the open ones for all those la- [illegible] and furnishes pleasing light. The rooms for the men are [illegible] to be so arranged as to afford coolness in summer, but to be [illegible] in winter. In the general design of the house, to see" that the open side be toward the south, whereby [illegible] will enjoy the sun, in summer the shade. (Since [illegible] to [illegible], Memorabilia, VII, 2, 5, in houses turned toward the south, the sun shines into the porticoes, while in summer it passes over the projecting roof). The women's apartment to be separated from the men's apartment by door and bolt, so that nothing may be taken out of the interior, unless authorized. The apartment cannot obtain much from their material.

[illegible]

The evil conditions designed for the entrance says close to [illegible] in time, and according to Aristotle's Essay on the Commonwealth of Athens, [illegible] there were as a result five police measures in the city of Athens to take care, that the scavengers [illegible] should not deposit garbage within a distance of 10 (?) stadia from the city wall, that none should build on the [illegible], or project high buildings over the street line, or carry high water-spouts toward the street, or should have the leaves of the door of his house open toward the street.

Note 3. Translated into German by G. Kabel and A. Wrasmiller [illegible]

*Note 3. On plans of houses, see Koldewey, R. Neandria etc. Berlin. 1891.*

*Note 4. See maps of Attica, edited by E. curtius and J. A. Kaupert. Explanatory text. Heft 1, p. 56. Fig. 7 (from a Milchhöfer). Berlin. 1881.*

Concerning the peculiar plan of the house about 400 B.C., a passage of Xenophon's Oikonomikos (Art of Housekeeping) affords some data; "(The house) is not adorned with decorations of all sorts (poikilemata, paintings, embroideries, carvings etc.); But the rooms are built with forethought, so that they may be apartments most suitable for what is to be in them, and that they may themselves invite propriety. The sleeping room in particular, placed with due retirement, requires the most costly ornaments and furniture, the dry rooms fo the house for the grain, the cold rooms for wine, the open ones for all those labors and furniture needing light. The rooms for the men are to be so arranged as to afford coolness in summer, but to be warm in winter. In the general design of the house, to see that its open side be toward the south, whereby in winter it will enjoy the sun, in summer the shade. (Since according to Socrates, Memorabilia, III, 8, 9, in houses turned toward the south, the sun shines into the porticos, while in summer it p passes over the projecting roof). The women's apartment to be separated from the men's apartment by door and bolt, so that nothing may be taken out of the interior, unless authorized".[1] The architect cannot obtain much from this material!

*Note 1. See Xenophon's Oikonomikos, translated by F. Zeising. Chap. IX. p. 48-49. Stuttgart. 1866.*

The evil conditions described for the entrance gave place to better in time, and according to Aristotle's Essay on the Commonwealth of Athens, [2] there were as a result five police masters in the city of Athens to take care, that the scavenger contractors should not deposit garbage within a distance of 10 (?) stadia from the city wall, that none should build on the streets, or project high buildings over the street line, or carry high water-spouts toward the street, or should have the leaves of the door of his house open toward the street.

*Note 2. Translated into German by G. Kaibel and A. Kiessling; 2 nd edit. p. 88. Strasburg. 1891. (The distance from the city*

ard" is indeed incorrectly assessed.

The excavations on Delos in July and August, 1928, led to the discovery of the plan of a house of the period of the 2nd century B.C., which Pierre Paris [1] published, and which we reproduce in Fig. 4208. The house had a single exit to the street and also no vestiges of windows; for the latter always form the exception and not the rule. The rooms obtained light through the doorways from the court, whose pavement was laid in mosaic of pieces of blue and white marble, and it contained a cistern. Paris is inclined to assume the house to have been in two stories, and he extends the peristyle into the upper story, induced to do this by the great mass of ruins of the building. [1]

Note 1. Concerning a house on Delos, also see Fresca, a [illegible]

Ross [2] expresses himself very clearly in respect to the houses on Delos as follows:-- "Still worse, since more easily destroyed, is it with the private houses, of which an entire quarter of the city would still be standing, were it not for such destruction. Their walls now usually remain for a height [illegible] portion is broken; the best stones, and especially the angle stones have been removed, and the others with the loose material from great heaps of rubbish, that cover the ruins. Beneath this rubbish are indeed concealed [illegible] complete plan might still be made of many ancient houses. -- The material of these dwellings is small stones of the local slate and granite, joined with mortar, the walls are internally lined with pieces of marble (whose marble ?), almost as hard as stone, on which may be recognized occasional vestiges of color. In many houses are found and partly still erect, granite columns of one to two "shoes" diameter, which have assured the rate for destruction by their greater hardness, or by the insignificance of their material. They chiefly stand [illegible] surrounding the inner courts of the houses. -- Several many houses, and houses under most, were arranged cisterns, partly

*wall is indeed incorrectly assumed.*

The excavations on Delos in July and August, 1883, led to t the discovery of the plan of a house of the period of the 2 nd century B.C., which Pierre Paris [3] published, and which we reproduce in Fig. 462. The house had a single exit to the street and also no vestiges of windows; for the latter always form the exception and not the rule. The rooms obtained light through the doorways from the court, whose pavement was laid in mosaic of pieces of blue and white marble, and it contained a cistern. Paris is inclined to assume the house to have been in two stories, and he extends the peristyle into the upper story, induced to do this by the great mass of ruins of the building. [1]

*Note 3. In Bull. de Corr. Hell. 1884. p. 473-496.Pl.21.*

*Note 1. Concerning a house on Delos, also see Greece, a handbook for travelers by K. Baedeker. Leipzig. 1888. p.147-148. (Later edition in English).*

Ross [2] expresses himself very clearly in respect to the house on Delos as follows:-- "Still worse, since more easily destroyed, is it with the private houses, of which an entire quarter of the city would still be standing, were it not for such barbarism. Their walls now usually remain for a height of two or three "shoes" (i.e. 1.97 to 2.94 ft.); the upper portion is broken; the best stones, and especially the angle stones have been removed, and the others with the loose material form great heaps of rubbish, that cover the ruins. Beneath this rubbish are indeed concealed many mosaic floors, and a complete plan might still be made of many ancient houses. -- The material of these dwellings is small stones of the local slate and granite, joined with mortar, the walls are internally lined with pieces of marble (stucco marble ?), almost as hard as stone, on which may be recognized occasional vestiges of color. In many houses are found and partly still erect, granite columns of one to two "shoes" diameter, which have escaped the rage for destruction by their greater hardness, or by the insignificance of their material. They chiefly stand in squares of eight or twelve, and apparently formed portocos surrounding the inner courts of the houses. -- Beneath many houses, and perhaps under most, were arranged cisterns, partly

covered by porous screens, partly covered merely by lard cloths slabs, on which rested the pavement".

Note 8. In Ross, J. Walsen auf den Grenzinseln Tunesien des Ausgrabungen Leeres. Vol. 1. p. 22 et seq. Accessible in Inst. Inst. Publication [illegible] and Sykes and Bowen. Lindsay and Johnson. 1912.

The door from Delos exhibits a higher architectural design of a Greek private house, and even of a similar one was possible instead of the complaint of Demosthenes, that the private dwelling had become so large and the public buildings so small, while the reverse was formerly true.

The contrast between the modest ancient and the later modern and architectural style was afterwards emphasized by Hadrian also, by his inscription on the arched gateway near the Olympieion in Athens built by him, where with a certain self-consciousness, he commemorated the fact that the Greeks had now

on whose the rooms opened, receiving from it light and air.'

Vitruvian Essay (VI, 7) in these or in the Greek houses near the entrance doorway a passage of moderate width, on one side of which lay the stable for the horses, and on the other were the rooms for the doorkeeper, and which could be closed by a strong doorway at the end. This space between the two doorways was terrain overcrowing. Then followed the entrance to

the court, the wall opened between two antes set far apart. and into room, the porticos or paradise, was made about one-third less in depth than width.

Thence inward were arranged large halls in which the housewife sat with the wool-spinners. On the right and left of the prostaction were placed the sleeping rooms, one of which was called the thalamus, the other being the anthalamus. On both sides of the porticos were arranged the dining room, reception rooms and the servants' rooms. This portion of the building was then termed the women's dwelling. Upon entering this was then constituted a spacious hall with side columns courts, those four colonnades were either of equal height, or that towards the south had higher columns. Thus a court

covered by narrow arches, partly covered merely by long granite slabs, on which rested the pavement".

*Note 2. In Ross, L. Reisen auf den Griechischen Inseln des Aegäischen Meeres. Vol. I. p. 30 et seq. Appendix to third letter:-- Reisen und Alterthümer auf Delos und Rhenäa. Stuttgart and Tubingen. 1840.*

The plan from Delos exhibits a richer architectural design of a Grecian private house, and such or a similar one was the basis indeed of the complaint of Demosthenes, that the private dwellings had become so large and the public buildings so small, while the reverse was formerly true.

The contrast between the modest ancient and the later pretentious architectural styles was afterwards emphasized by Hadrian also, by his inscription on the arched gateway near the Olympeion in Athens built by him, where with a certain self-consciousness, he contrasted the new city with the homely ancient one.

The central point of the later house was found in the court, on which the rooms opened, receiving from it light and air.

Vitruvius places (VI, 7) in these or in the Grecian house near the entrance doorway a passage of moderate width, on one side of which lay the stable for the horses, and on the other were the rooms for the doorkeeper, and which could be closed by a second doorway at the end. This space between the two d doorways was termed dyroreion. Then followed the entrance to the court, with colonnades on three sides; on the side toward the south, the wall opened between two antes set far apart, and this room, the prostas or parastas, was made about one-third less in depth than width.

Thence inward were arranged large halls in which the housewife sat with the wool-spinners. On the right and left of the prostadion were placed the sleeping rooms, one of which was c called the thalamos, the other being the amphithalamos. But on both sides of the porticos were arranged the dining room, sleeping rooms and the servants' rooms. This portion of the building was then termed the women's dwelling.(Gynaikonitis). With this was then connected a spacious dwelling with wide columnar courts, whose four colonnades were either of equal height, or that toward the south had higher columns. Suca a court with three porticos of equal height and a higher one was termed

"-nuitions". East the portico covered the open lay roots for ex-
tine and for paintings, or that next the east being the library.
ry, that next the west being a conversation room, but a square
hall next the south, which should be so large, that four dis-
ing tables could be set thereon, still leaving space for exer-
cise and for plays. The men's banquets were held there; there-
fore this portion was called the men's dwelling (andronitis).
On the right and left of it were placed small dwellings with
comfortable dining and sleeping rooms for guests, so that these
could retreats in separate apartments and not in the common
[illegible]
by messages.(Meteorion and kasaulos).

Vitruvius also places the andronitis in the rear and the gy-
naikonitis in the front positively, opposed to the other tradi-
tion. A delicate e test indeed comes here; that any true exis-
ence is impossible, when the two original modes of the house
interpenetration places, but it is not to be bemoaned with what
is already made in regard to the place of the women in "
the house.

Hooper's conventional plan in Fig. 66 therefore corrects the
errors of Vitruvius, and which according to Pliny might have
certainly been improved.

The great rooms must here be satisfied with a single entrance
doorway, as in Pompeii; so partial adorned with columns dem-
ration, as erroneously assumed for a house on Delos:

Tarbell, F. B. The House at Delos. The Classical Review. Vol.
5, no. 3, March 1891, p. 120, 121.

Hence if the exterior of the house appears simple and plain,
on the contrary the interior was arranged with much skill and
[illegible]
architecture again produced splendid and original things.

The courts with their porticos adorned by columns, richly
decorated walls of the entrance, the surfaces of the walls of
the reception and living rooms, covered with white stucco lis-
[illegible]
the floors covered by rich carpets, the elegant furnitures,

"Rhodian". Next the portico toward the north lay rooms for eating and for paintings, or that next the east being the library, that next the west being a conversation room, but a square hall next the south, which should be so large, that four dining tables could be set therein, still leaving space for service and for plays. The men's banquets were held there; therefore this portion was called the men's dwelling (andronitis). On the right and left of it were placed small dwellings with moderate dining and sleeping rooms for guests, so that these found lodgings in separate apartments and not in the columnar courts. The two columnar courts were connected at the middle by passages.(Metaulos and mesaulos).

Vitruvius also places the andronitis in the rear and the gynaikonitis in the front peristyle, opposed to the other tradition. A defective text indeed occurs here; that any time existed is improbable, when the two principal parts of the house interchanged places, and it is not to be harmonized with what is elsewhere stated in regard to the place of the women in the house.

Becker's conjectural plan in Fig. 464 therefore corrects the errors of Vitruvius, and which according to Winkler might have originally been improved.

The great house must here be satisfied with a single entrance doorway, as in Pompeii; no portal adorned with columns gave admission, as erroneously assumed for a house on Delos; [1]

*Note 1. See Paris in Bull. de Corr. Hell. 1884, p. 474; also Tarbell, F. B. The House at Delos. The Classical Review. Vol. 5, no. 3; march 1891. p. 130, 131.*

Hence if the exterior of the house appears simple and plain, on the contrary the interior was arranged with much skill and great picturesque effect; an agreeable luxury developed , and architecture again produced splendid and original things.

The courts with their porticos adorned by columns, richly decorated walls of the entrance, the surfaces of the walls of the reception and living rooms, covered with white stucco finish and painting, the panels of the ceiling with their carving (Vitruvius, VI, 7), the doorways hung with heavy stuffs, and the floors covered by rich carpets, the elegant furniture,

flowers, and potted articles, the sparkling water splashing in the bright sunshine, the deep blue sky over the green courts, [illegible] attractive views and beautiful perspectives from all points, all harmonize to delighten the conception of a splendid and yet comfortable dwelling.

To behold magnificence of facade with plain interior, as so common today in the German empire, those architectural fantasies, overloaded with columns and arcades, those barracks [illegible] plan and, not even in the late period: man built not for [illegible] and their guests. Hence the charm belonging to the sections [illegible] courts and alternations will recur more and more in the houses architectures of all civilized races. Man will outlast us.

To avoid repetition, a thoroughly treatment of the late Grecian house is here omitted, such as is usually presented on the basis of the well preserved and palsted Pompeian House.

The ancient Grecian family dwelling was not directly connected with the street, like the low ranked houses, a separate type of which did not exist, and which could scarcely have had any claim on an aesthetical criticism, just as little as the poor multitude of the ordinary shelter rationes of our own time.

[illegible] relatively but little direct information can be given with certainty. Neither the existing structural remains nor the i [illegible] writers afford satisfactory data in this respect.

Cellars beneath the family dwellings are everywhere proved. If the houses were built on a rocky site, excavations in the rock frequently occurred instead of cellars (like such in the vicinity of modern Athens and of the Piraeus, also to be frequently found in Troia) for storage provisions.

The exterior walls of sun-dried bricks or burnt stone remained internally and externally a constant, which usually consisted of ordinary lime plaster, the increasing magnificence of the late period alone commenced to decorate the walls both

flowers, and netted articles, the sparkling water splashing in the bright sunshine, the deep blue sky over the open courts, the magnificent effects of lighting, the light and shade, the attractive views and beautiful prespectives from all points, all harmonize to heighten the conception of a splendid and yet comfortable dwelling.

No hollow magnificence of facade with plain interior, as so common today in the German empire, those architectural falsities, overloaded with columns and caryatids, those barracks f for rental externally representing palaces, are found on Grecian soil, not even in the late period; men built not for show-loving street passers but for themselves, their families and their guests. Hence the charm belonging to the antique house may never be stripped off, and for this reason its chief points and attractions will recur more and more in the house architecture of all civilized races, and will outlast us.

To avoid repetition, a thorough treatment of the late Grecian house is here omitted, such as is usually attempted on the basis of the well preserved and related Pompeian house.

The ancient Grecian family dwelling was not directly connected with the street, like the low rented house, a separate type of which did not exist, and which could scarcely have had any claim on architectural criticism, just as little as t the great multitude of the ordinary shelter buildings of our own time.

Concerning the construction and arrangement of the house, relatively but little direct information can be given with certainty. Neither the existing structural remains nor the i ancient writers afford satisfactory data in this respect.

Cellars beneath the family dwellings are everywhere proved. If the house were built on a rocky site, excavations in the rock frequently occurred instead of cellars (like such in the vicinity of modern Athens and of the Piraeus, also to be frequently found in Sicily) for storing provisions.

The external walls of sundried bricks or natural stone received internally and externally a coating, which usually consisted of ordinary lime plaster; the increasing magnificence of the late period alone commenced to decorate the walls both

simple roofs of Portico [illegible], [illegible] it is said, that it was covered by [illegible] planks (shingles): we should imagine this description of the roofs of the [illegible] to be perhaps like the [illegible] in [illegible], where broken [illegible] were [illegible] against the rock and wooden walls were constructed of polygonal masonry in represented in fig. 60.

The doorways (rectangular entrance doors) were closed by jambs of woodwork, that might be covered by bronze plates; they turned on sockets, were [illegible] or marble still [illegible] on [illegible] thresholds and lintels. The [illegible] was by an inner trapezoid [illegible] placed in the portico and raised or even lowered from the exterior by a kind of key. The doorways in the interior were frequently hung with fabrics, as still usual in the south.

Windows are proved by representations or were [illegible] and [illegible] series of sculpture art, where women looking out of the windows [illegible]; hence they were not [illegible], but were usually arranged in the upper stories alone, as it the [illegible] for [illegible]. They were closed by wooden shutters or by [illegible].(Fig. 60).

The ceilings of the rooms were usually made with wooden [illegible] or were decorated by [illegible], color and [illegible]. The roofs (simple [illegible] roofs) were constructed of heavy timbers and covered by clay-or-stone, [illegible] or flat tiles.

A useful [illegible] room could scarcely be found on account of the slight inclination of the roof surfaces, in most cases. The framework of the roof alone formed the ceiling of the room or store.

Chimneys (smoke flues) were only in kitchens; the rooms were not in cool weather by [illegible] braziers or by portable stoves ([illegible], [illegible], [illegible]) as still the case in the south. 1

Note 1. See [illegible]. G. Zoss, Bautechnik [illegible]. Vol. 2. p. 115. [illegible].

Windows in the rooms were [illegible] only later. In [illegible] they were [illegible] in Greece already in the second [illegible] [illegible] and offers for their [illegible] are [illegible]: the [illegible]

inside and outside with paintings. Of the otherwise plain and simple house of Phocion (Plutarch, 18) it is said, that it was adorned by bronze plates (sheets); we should imagine this decoration of the house of the general to be perhaps like that on the Council hall in Elis, where bronze shields were suspended "for ornament". (See Pausanias). A simple Lycian house, built against the rock and whose walls were constructed of polygonal masonry is represented in Fig. 465.

The doorways (principal entrance doors) were closed by leaves of woodwork, that might be covered by bronze plates; they turned on pivots, whose sockets or marks still appear on many thresholds and lintels. The fastening was by an inner transverse bar placed by the porter and raised or even lowered from the exterior by a kind of key. The doorways in the interior were frequently hung with fabrics, as still usual in the south.

Windows are proved by representations on vase paintings and other works of antique art, where women looking out of the windows occasionally occur; hence they were not uncommon, but were chiefly arranged in the upper stories alone, as in the houses for rental. They were closed by wooden shutters or by fabrics.(Fig. 466).

The ceilings of the rooms were plainly made with wooden beams or were decorated by carving, color and paneling. The roofs (simple gable roofs) were constructed of hewn timbers and covered by clay-and-straw, curved or flat tiles.

A useful attic room could scarcely be found on account of t the slight inclination of the roof surfaces, in many cases, the framework of the roof alone formed the ceiling of the upper story.

Chimneys (smoke flues) were only in kitchens; the rooms were warmed in cool weather by charcoal braziers or by portable stoves (andrachia, pyraunoi, chaminoi) as still the case in the South. [1]

*Note 1. See Jahrb. d. Kais. Deutschen Arch. Inst. Vol. 5. p. 118. Berlin. 1890.*

Privies in the house must have become common only later. In Pausanias they were determined in Cnossos already in the second thousand years B.C. Quotations from Aristophanes, Demosthenes and others for their early occurrence are uncertain; the earl

"J.J." in Athenaeus (p. 417), where it is said, that the Italians at least had places, that were near and arranged conveniently for certain purposes. The trustworthy Herodotus tells us of his time (Book II, 35):-- "Thus nearly all customs and uses of the Egyptians are opposed to those of other men; -- they satisfy the demands of nature in the houses; but they take their food in the streets and say concerning this, that are about so in privacy, what may be unseemly though necessary, but in public, what is, not be unsightly.

The floor is to be understood as being of stone, mosaic or slabs, covered by skins or rugs during the cooler season of the year.

Although we must conceive the dwelling of the best period as being simple and plain in its exterior and construction, yet the furnishing and utensils must be imagined as progressively dressed with the refined sense of beauty, "which has been called the inheritance of the entire Greek race". "

On vase paintings of the entire early period, we find artistically restored and treated furniture; tables, chairs and beds. Tables are only used at meals; work tables in our sense did not exist; for example, sitting was done on the floor. Wardrobes were not used in housekeeping; in chests or portable boxes were placed articles and clothing materials, and in small caskets were ornaments of gold and silver, ivory and precious stones. Many things were also kept in great vessels of clay.

Vessels were made of wood, of burned clay and of metal; in their treatment and execution appeared the extraordinary artistic gifts of their makers in a high degree, as shown by the many remaining ones, amulets, drinking goblets, lamps, candelabra, mixing vases, nuptial vases, and the metal mirrors of such great artistic importance.

Hotels in the modern sense were unknown to classic antiquity. The enjoyments of the table and the commerce in the cups were limited to the circle of friends in the house.

Public inns were mentioned in treating places and baths, in festival and pilgrimage localities, and where the selling of wine is mentioned, these and their visitors enjoy no good reputation. [illegible]

earliest is to be esteemed a passage of Eubulos (4 th century B.C.) in Athenaeus (p. 417), where it is said, that the Thebans at least had places, that were near and arranged conveniently for certain purposes. The trustworthy Herodotus tells us of his time (Book II, 35):-- "Thus nearly all customs and uses of the Egyptians are opposed to those of other men; -- they satisfy the demands of nature in the houses; but they take their food in the streets and say concerning this, that one shoul do in privacy, what may be unseemly though necessary, but in public, what may not be unsightly.

The floor is to be understood as being of stone, mosaic or slabs, covered by skins or rugs during the cooler season of the year.

Although we must conceive the dwelling of the best period as being simple and plain in its exterior and construction, yet its furnishing and utensils must be imagined as progressively treated with the refined sense of beauty, "which has been called the inheritance of the entire Grecian race".

On vase paintings of the entire early period, we find artistically perfected and treated furniture; tables, chairs and beds. Tables are only used at meals; work tables in our sense did not exist; for example, writing was done on the knee. Wa Wardrobes were not usual in housekeeping; in chests or portable boxes were placed articles and clothing materials, and in small caskets were ornaments of gold and silver, ivory and precious stones. Many things were also kept in great vessels of clay.

Vessels were made of wood, of burned clay and of metal; in their treatment and execution appeared the extraordinary artistic gifts of their makers in a high degree, as shown by the many remaining cups, shallow drinking goblets, lamps, candelabra, mixing vases, unguent vases, and the metal mirrors of such great artistic importance.

Hotels in the modern sense were unknown to classic antiquity. The enjoyments of the table and the communion in the cups were limited to the circle of friends in the house.

Public inns were mentioned in trading places and harbors, in festival and pilgrimage localities, and where the selling of wine is mentioned, these and their visitors enjoy no good repute. Very little information concerning their arrangement

has become known.

[illegible] as of a better rectors.[1] The building has of rectangular plan (see [illegible]). It which [illegible] and rooms were grouped around a court 22.4 ft. square. The court was itself decorated by flower beds and water basins, these dated being of the Roman period; the columns in the inscriptions were of the Doric order, while on the exterior, Ionic colonnades surrounded the building, that in the most magnificent way must have fulfilled its purpose as a hotel for guests of honor of the State of Ilion, for friendly princes and statesmen.

Note 1. See Alterthümer, Vol. IV. p. 42, pl. 68; V. p. 8, 9, 41, 42, 43, 41.

On the soil of Asia Minor, by the labors of G. Niemann and E. Petersen, has been made known to us a greater dwelling, the house of Mistris at Termessos in Pisidia, whose ground plan is given in Fig. 427. Its partly preserved walls are constructed of smooth sandstone 1.97 ft. which in alternately high and low courses. [illegible] entrance doorway exhibits next the street Doric antes, above which are architrave, triglyph frieze and cornice, whose cyma is beset by lions' heads. The opening has a clear height of 14.9 ft. The arrangements for closing the doors and windows still remain. They consist of wooden doors in two leaves and wooden shutters.[1]

Note 1. [illegible] Alterthümer und Inschriften aus Lykien, Pamphylien und Pisidien. Vol. 2. p. 101. Vienna. 1889.

By the excavations at Priene, we have not only recovered the entire plan of the city, but even the ground plans of the separate houses are disclosed to us. They exhibit no compositions on axes, like those of the houses on Delos or at Pompeii; nor [illegible] tural view of the dwellings, but rather the opposite.

A long and narrow passage at the side leads into the interior, from which one passes into the court and the living rooms, as shown by Fig. 428 of the plan of house No. 20 in its original design. (See the German publication on Priene. p. 298).

has become known.

The Leonidaion in Olympia may be regarded as a house arranged on a better footing.[1] The building was of rectangular plan (241.08 × 263.06 ft.), in which halls and rooms were grouped around a court 98.4 ft. square. The court was itself decorated by flower beds and water basins, these indeed being of the Roman period; the columns in the interiors were of the Doric order, while on the exterior, Ionic colonnades surrounded the building, that in the most magnificent way must have fulfilled its purpose as a hotel for guests of honor of the State of Elis, for friendly princes and statesmen.

*Note 1. See Ausgrabungen. Vol. IV. p. 49, pl. 38; V. p. 8, 43, pls. 6, 41.*

On the soil of Asia Minor, by the labors of G. Niemann and E. Petersen, has been made known to us a greater dwelling, the House of Kleistos at Termessos in Pisidia, whose ground plan is given in Fig. 467. Its partly preserved walls are constructed of smooth ashlars 1.97 ft. thick in alternately high a and low courses. Windows and doorways still remain. The main entrance doorway exhibits next the street Doric antes, above which are architrave, triglyph frieze and cornice, whose cyma is beset by lions' heads. The opening has a clear height of 14.6 ft. The arrangements for closing the doors and windows still remain. They consist of wooden doors in two leaves and wooden shutters.[1]

*Note 1. See Städte Pamphyliens und Pisidiens, with the collaboration of G. Niemann and E. Petersen, edited by Count Carl Lanckaronsky. Vol. 2. p. 101. Vienna. 1892.*

By the excavations at Priene, we have not only recovered the entire plan of the city, but even the ground plans of the separate houses are disclosed to us. They exhibit no compositions on axes, like those of the houses on Delos or at Pompeii; men do not wish to show to a person entering a consistent architectural view of the dwelling, but rather the opposite.

A long and narrow passage at the side leads into the interior, from which one passes into the court and the living rooms, as shown by Fig. 468 of the plan of house No. 38 in its original design. (See the German Publication on Priene. p. 285).

The authors of the splendid work do not exclude the two-story design of the house, and they place the stairway to the attic or upperstory in the room 7.7 ft. wide beside the rooms designated as prostas and oecus. They also indicate stairway arrangements not at hand in the question of providing the women's rooms, when they lament the absence of the upper stories in place. They find necessity in domestic architecture, when big and stable rocks are assumed and in which naturally resulting rooms above the ceiling beams, that these must be made accessible. But they could not be omitted for terrace roofs, as these were also to be made accessible and usable.

There remains as characteristic for the designated typical plan No. 22, the sunny and open uncovered court, not surrounded by porticos, with an exedra opening into it and adjoining side rooms, opposite to which is a prostas, that is characterized by an external architecture like an ante temple, behind which is found a cool and sunny oecus. Between exedra and oecus are inserted some living and housekeeping rooms. The peculiar court ends on the fourth side of the extended house entrance with a hip roof borne by slender supports. From this scheme are developed the ground plans of most houses, that likewise here as in Pompeii do not consist strictly in detail but are frequently to be regarded as variations on the same ground theme.

In the sketch of the restoration given by Th. Wiegand (p. 222) is no two-story construction of the house, but instead of it a development of the roofs of a one-story design, that is not credible. The prostas and oecus are emphasized as ante temple architecture with triangular frieze and gable roof, as being architecturally complete and entirely detached rooms, adjoined by the other parts of the building with low shed roofs, thus producing esthetic and technical imperfect works, that are foreign to the antique. Fig. 229 exhibits the roofs chosen, where the solution at the left corner did not pass without question. An arrangement of the roofs as given on Pompeian houses would have been more acceptable (Fig. 270), even if the covered connecting passage to the rear part of the house were only carried at the ground level. The prostas and oecus might be elevated

The authors of the splendid work do not exclude the two-story design of the house, and they place the stairway to the attic or upperstory in the room 7.7 ft. wide beside the rooms designated as prostas and oecus. They also indicate stairway arrangements not at hand in the question of providing the women's rooms, when they lament the absence of the upper stories in place. They find necessity in domestic architecture, when hip and gable roofs are assumed and in which naturally result useful rooms above the ceiling beams, that these must be made accessible. But they could not be omitted for terrace roofs, as these were also to be made accessible and usable.

There remains as characteristic for the designated typical plan No. 33, the sunny and open uncovered court, not surrounded by porticos, with an exedra opening into it and adjoining side rooms, opposite to which is a prostas, that is characterized by an external architecture like an ante temple, behind which is found a cool and sady oecus. Between exedra and oecus are inserted some living and housekeeping rooms. The rectangular court ends on the fourth side of the extended house entrance with a hip roof borne by slender supports. From this scheme are developed the ground plans of most houses, that likewise here as in Pompeii do not consist entirely in details but are frequently to be regarded as variations on the same ground theme.

In the sketch of the restoration given by Th. Wiegand (p. 286) is no two-story construction of the house, but instead of it a development of the roofs of a one-story design, that is not probable. The prostas and oecus are emphasized as ante temple architecture with triglyph frieze and gable roof, as being architecturally complete and entirely detached forms, adjoined by the other parts of the building with low shed roofs, thus producing esthetic and technical imperfect works, that are foreign to the antique. Fig. 469 exhibits the roofs chosen, where the solution at the left corner did not pass without question. An arrangement of the roofs as given on Pompeian houses would have been more acceptable (Fig. 470), even if the covered connecting passage to the rear part of the house were only carried at the ground level. The prostas and oecus might be elevated

and have an imposing effect, without meeting them a temple or the facade of the house of a god of Amun.

I presume that there were also in Grieve stores and winter rains. Protection against them would not be attained by the given successive arrangement of the rooms without connecting doorways. To reach the exedra or the rooms next it, one must pass across the court without protection in bad weather. From the street rain through the covered entrance to the house, across the wet court into the rooms and to pass again from one to the other, one must again cross the court! What the inhabitants of Grieve with the so-called "sunny court system" have actually and entirely forgotten the system of protection against wind and weather?

As in all periods and among all peoples, men certainly paid attention to the points of the compass, so far as possible, in the location of the rooms according to their purposes.

[illegible]

the houses according to the position of the sun. They sought in summer the shade, in winter the sun; they remained in the morning before the western side of the house, in the evening before the eastern.

In technically notable things, Th. Wiegand states that he has established three species of Hellenistic house walls.

1. Split stone walls with isodomic ashlar facades.

2. [illegible]

3. Adorned brick walls.

For mortar was only employed clay, and only the local and nearest sorts of marble were considered. The external surfaces of the ashlars had bosses, the margins of the ashlars were from 0.29 to 1.74 ft., their lengths being from 1.74 or 1.87 to 3.29 ft. The connecting cramps, that came into use only exceptionally, had the U-form. The thickness of the walls is usually 2.6 ft., which were of split stones coated with stucco. Walls of split stone below and of adorned bricks above have been found; a kind of layers required by the nature of the material. In the ocrus the height of the rooms is given as up to 16.7 ft.,

and have an imposing effect, without making them a temple or the facade of the house of a son of Anak.

I presume that there were also in Priene storms and winter rains. Protection against them would not be afforded by the given successive arrangement of the rooms without connecting doorways. To reach the exedra or the rooms next it, one must pass across the court without protection in bad weather. From the street rains through the covered entrance to the house, across the wet court into the rooms and to pass again from one to the other, one must again cross the court! Must the inhabitants of Priene with the so-called "sunny court system" have actually and entirely forgotten the system of protection against wind and weather?

As in all periods and among all peoples, men certainly paid attention to the points of the compass, so far as possible, in the location of the rooms according to their purposes.

I have often enough observed in the open air in Sicily and other southern countries, how the peasant women and children constantly shifted their places for working and playing before the house according to the position of the sun. They sought in summer the shade, in winter the sun; they remained in the morning before the western side of the house, in the evening before the eastern.

In technically notable things, Th. Wiegand states that he has established three species of Hellenistic house walls.

1. Split stone walls with isodomic ashlar facades.
2. Ordinary split stone walls.
3. Airdried brick walls.

For mortar was only employed clay, and only the local and nearest sorts of marble were considered. The external surfaces of the ashlars had bosses, the heights of the ashlars were from 0.98 to 1.74 ft., their lengths being from 1.74 or 1.97 to 3.28 ft. The connecting cramps, that came into use only exceptionally, had the U-form. The thickness of the walls is usually 2.3 ft., which were of split stones coated with stucco. Walls of split stone below and of airdried bricks above have been found; a kind of layers required by the nature of the material. In the oecus the height of the rooms is given as up to 19.7 ft.,

which in view of their dimensions in length and breadth (85.0 × 85.0 and 12.7 × 12.8 ft.) may be designated as not altogether beautiful proportions of the interior. The well-preserved in the interior exhibits the so-called incrustation style with [illegible]

the simplest limestone, more rarely marble, and bears only the most decorative execution. Windows to lower remain, which recalls the influence of a high position for them, as in the house on Delos. As closures frequently served perforated terra cotta plates 1.7 ft. wide and 2.3 ft. high. The door leaves swung inward, as shown by the door hinges on the sills. The roof was that common from ancient times and covered by flat and concave tiles.

All Hellenistic roof tiles exhibit the traces of a reddish brown coating, similar to the terra sigillata, but without its peculiar matte glaze.

The citizens' dwellings were in extent and splendor of equipment equalled by the residences of the nobles, the palaces of the kings, besides the royal villas, to be mentioned with its parks and game preserves, fish ponds, estate gardens, waterworks etc. Details of these are preserved. The remains of an older and of a later one in simple forms are to be found on t the acropolis of Pergamon, that indeed date from the time of Eumenes II. Around a court successively portices are grouped the halls and larger apartments, south of which are the service buildings.(Fig. 471).

Not connected with this small design are ever larger ones as in Alexandria, Antioch and Byzanse.

The royal palace in Alexandria occupied a third of the Greek city. Concerning that in Byzanse, A- Boim states in his Geographie Distinlens (Vol. III, pe 1V. Leipzig, 1888), that it later served Verres as an official dwelling, in which he had arranged for months a gladiator's show, to please for his own purposes the consignered vessels of the noble metals.

Besides the palaces must still be mentioned the buildings for arts and sciences, which stood in relation to them, among which the library in Pergamon may be referred to, north of the court of the Temple of Athena. The traces of the colonnes a

which in view of their dimensions in length and breadth (23.0 × 23.0 and 12.1 × 16.4 ft.) may be designated as not affording beautiful proportions of the interior. The wall decoration in the interior exhibits the so-called incrustation style with brightly colored ashlar courses, as floor covering served the simplest limewash, more rarely mosaics, and there only the most primitive execution. Windows no longer remain, which permits the inference of a high position for them, as in the houses on Delos. As closures frequently served perforated terra cotta plates 1.7 ft. wide and 2.3 ft. high. The door leaves swung inward, as shown by the door rebates on the sills. The roof was that common from ancient times and covered by flat a and concave tiles.

All Hellenistic roof tiles exhibit the traces of a reddish brown coating, similar to the terra sigillata, but without its peculiar matted glaze.

The citizens' dwellings were in extent and splendor of equipment equalled by the residences of the nobles, the palaces of the kings, besides the royal villas, to be mentioned with their parks and game preserves, fish ponds, state gardens, waterworks etc. Little of these has been preserved. The remains of an older and of a later one in simple forms are to be found on t the acropolis of Pergamon, that indeed date from the time of Eumenes II. Around a court surroungedby porticos are grouped the halls and larger apartments, south of which are the service buildings.(Fig. 471).

But contrasted with this small design are even larger ones as in Alexandria, Antiochia and Syracuse.

The Royal Palace in Alexandria occupied a third of the Grecian city. Concerning that in Syracuse, A- Holm states in his Geschichte Siziliens (Vol. III, pa 173. Leipzig. 1898), that it later served Verres as an official dwelling, in which he had arranged for months a goldsmith's shop, to prepare for his own purposes the confiscated vessels of the noble metals.

Beside the palaces must still be mentioned the buildings for arts and sciences, which stood in relation to those, among which the Library in Pergamon may be referred to, north of the court of the Temple of Athena. The traces of the bookcases a

are still preserved. (Figs. 475 a, b give the ground plan and the section after the drawings of F. Cobb. Still more valuable materials have been supplied to us by Dr. E. Breccia discoveries in Kreemos, in the Library of Ptolemy, which was built in honor of this ruler by his son about 100 A.D. It shows a rectangular hall for the books with an exedra and niches in the walls for presses, a podium in front with a flight of monumental steps, something over 88.6 ft. in length.

The hall was surrounded by galleries on three sides. Outside it extended side canals on the west and south to prevent dampness. The entrance façade in two stories adorned by coupled columns had a stately effect. (Figs. 476, 477) Ground plan in dotted. c. Ceil. Arch. Test. Vol. XI. 1908.

are still preserved. Figs. 472 a, b give the ground plan and the section after the drawings of R. Bohm. Still more tangible materials have been supplied to us by the K. K. Austrian discoveries in Ephesus, in the Library of Celsius, which was built in honor of this ruler by his sons about 100 A.D. It shows a rectangular hall for the books with an exedra and recesses in the walls for presses, a portico in front with a flight of continuous steps, something over 65.6 ft. in length.

The hall was surrounded by galleries on three sides. Outside it extended wide canals on the rear and ends to prevent d dampness. The entrance facade in two stories adorned by coupled columns had a stately effect. (Figs. 473, 474; ground plan and exterior after the beautiful drawings of Wilhelm Wilberg in Jahrb. d. Oest. Arch. Inst. Vol. XI. 1908.

## SECTION XII. HOMES AND MONUMENTAL TOMBS.

To bury the dead decently and cheerfully was a sacred duty in Greece; the relatives took great care that this should be done; it was strictly held, that even at least a handful of earth should be scattered over the corpse of a stranger.

The prevailing form of burial of the dead was by inurnement, [illegible] and [illegible]

[illegible] nation was likewise common from an early time, it does not appear to have been uniform in all periods and was not everywhere usual.

To bury the dead in their own dwellings, in court or garden, was permissible according to the ground plans of the oldest Asia-Minor houses resting on the rock terraces (fig. 460). The burial of the dead beloved the gates of the city in separate places or properly along the public ways was common; burial within the city, where it did not continue as a custom (as for example in Delphi) was regarded as a special privilege or distinction.

Special indications characterized the burial places. As mainly visible mounds of earth, often surrounded by circles of stones and with a memorial on the spot, were they shaped in the heroic period, as for example, the graves of the Atheniens, who fell in the battle of Marathon, was marked by a mound of earth.

In the midst of the plain of Marathon, a single conical hill, almost bare and with a few houses, rises about 32.5 ft. high above the level land. This hill is now known as "Soros", and it is held to be the burial place of the 192 Athenians, who fell in the battle near Marathon, and it has furnished the chief grounds for locating the battle-field. But the accuracy of this assumption might be doubted, since the excavations undertaken at this place were without result. At the beginning of the last century the hill was thoroughly examined, and Fauvel also set the diggers at work here some years since. A systematic investigation of the hill was recently begun, and this time investigation led to the desired success. In the midst of about 100 it. diameter was cut a trench 12.7 ft. wide and 32.8 ft. long, which lay here about one-fifth of the en-

DIVISION XIV. TOMBS AND MONUMENTAL TOMBS.

To bury the dead decently and carefully was a sacred duty in Greece; the relatives took great care that this should be done; it was strictly held, that even at least a handful of earth should be scattered over the corpse of a stranger.

The prevailing form of burial of the dead was by interment, both in the mother country and in the colonies. Although cremation was likewise common from an early time, it does not appear to have been uniform in all periods and was not everywhere usual.

To bury the dead in their own dwellings, in court or garden, was permissible according to the ground plans of the oldest Athenian houses resting on the rock terraces.(Fig. 460). The burial of the dead before the gates of the city in separate places or preferably along the public ways was common; Burial within the city, where it did not continue as a custom (as for example in Tarentum) was regarded as a special privilege or distinction.

Special indications characterized the burial places. As widely visible mounds of earth, often surrounded by circles of stones and with a memorial on the apex, were they shaped in t the heroic period, as for example, the grave of the Athenians, who fell in the battle of Marathon, was marked by a mound of earth.

In the midst of the plain of Marathon, a single conical hill, almost bare and with a few bushes, rises about 29.5 ft. high above the level land. This hill is now known as "Soros", and it is held to be the burial place of the 192 Athenians, who fell in the battle near Marathon, and it has furnished the chief grounds for locating the battle-field. But the accuracy of this assumption might be doubted, since the excavations undertaken at this place were without result. At the beginning of the last century the hill was thoroughly examined, and Schliemann also set the spades at work here some years since. A systematic investigation of the hill was recently begun, and this third investigation led to the desired success. In the hill of about 164 ft. diameter was cut a trench 19.7 ft. wide and 85.3 ft. long, which laid bare about one-twelfth of the en-

entire area of the base of the hill. But while the earlier

9.9 ft. below the level of the surrounding plain. So much is the elevation of the ground, resulting in the course of centuries. At this depth below the present surface was found the original surface. Here was a layer of ashes extending over one entire area of the grave, strewn with burned bones and the remains of burial vases. This fact makes it undoubted, that the burial of a great number occurred here, just as might have been only after a battle. Moreover since the buried vases corresponded for the dead entirely suit in their style the period preceding the battle of Marathon, it is no longer to be doubted, that we indeed have here the grave of the 192 Athenians slain near Marathon. The layer of ashes extending over the area of the tumulus is so thick, that one may assume that a great funeral pyre was built on this place, on which were burned the corpses of the fallen. In this layer of ashes are still found bones not completely consumed by fire, but then still permit the recognition of the structure of the wood. The bones found are much injured and show the marks of burning: a

was then caused by dampness. The pressure of the earthen mound, reaches about 39.4 ft. high above the burial place, may have contributed to the fact, that scarcely a single one of the vases found has remained unbroken. About thirty vases of Ionian type form have been found up to this time, which are decorated

art are among them, this material is still of great value for the study of vases, since a fixed later point is here given

one by this discovery, and recalls to the present race the most heroic era of the war of ancient Greeks for freedom.

Dörpfeld, Athen. Mitth. (Pkm. 6). p. 126-128.

Sculptures also rise in form of pyramids (Cucurres) from the ground; they are scattered over all Greece to Asia as columns and steles. With increasing luxury, the latter received rich

reliefs enclosed by columns and crowned by architraves.

entire area of the base of the hill. But while the earlier excavation was not carried sufficiently deep, this was sunk 9.9 ft. below the level of the surrounding plain. So much is the elevation of the ground, resulting in the course of centuries. At this depth below the present surface was found the original surface. Here was a layer of ashes extending over the entire area of the grave, strewn with burned bones and the remains of burial vases. This find makes it undoubted, that the burial of a great number occurred here, just as might have been only after a battle. Moreover since the burial vases provided for the dead entirely suit in their style the period preceding the battle of Marathon, it is no longer to be doubted, that we indeed have here the grave of the 192 Athenians slain near Marathon. The layer of ashes extending over the site of the tumulus is so thick, that one may assume that a great funeral pyre was built on this place, on which were burned the corpses of the fallen. In this layer of ashes are still found brands not completely consumed by fire, but that still permit the recognition of the structure of the wood. The bones found are much injured and show the marks of burning; a great part of the vases are also burnt. Further destruction was then caused by dampness. The pressure of the earthen mound, heaped about 89.4 ft. high above the burial place, may have contributed to the fact, that scarcely a single one of the vases found has remained uninjured. About thirty vases of lecythos form have been found up to this time, which are decorated by black figures hastily painted. If no particular marks of art are among them, this material is still of great value for the study of vases, since a fixed later point is here given for the date. A traditional monument has become a historical one by this discovery, and recalls to the present race the most heroic era of the war of ancient Greeks for freedom. [1]

*Note 1. From Allg. Zeit. 1890. Also Arch. Deltion. 1890. O tumbos ton Marathonomachenn (Pln. D). p. 123-132.*

Sepulchres also rise in form of pyramids (Cenchrea) from the ground; they are scattered over all Greece to Asia as columns and steles. With increasing luxury, the latter received rich figure sculptures; from this basal motive came later the broad heroons enclosed by columns and crowned by pediments.

They likewise rise as great isolated monuments, cut from the solid rock, as a high square pillar on a pedestal, or as in Cyprus, cut as a sarcophagus, also as imitations of dwellings, imitations of detached structures (Fig. 425 to 429), in the forms of chapels or temples. Wealthy houses or families had formal sepulchres built or cut in the rock, and they secured for themselves and their heir one place in family tombs.

Luxury in these matters appears to have risen to a high point. For example, Lysistris Eunieus had to issue a decree to limit them, and accordingly in Attica a sepulchral stele could not rise more than 3 ells above the burial mound. (See examples in the Ceramicus in Athens). -- Fig. 426.

The bodies of the poorer classes were buried in the common burial place of their community; sepulchral columns perpetuated their names even there.

If the body of the deceased could not be obtained, then an empty grave in imitation of the actual one was prepared as a memorial. For the missing one, an empty cenotaph bier was borne at the burial.

The corpse was placed in the clay coffin (sarcophagus proper), which was constructed of terra cotta in the form of a roof, and the use of which among the Athenians was regarded as a custom of their fatherland (Fig. 427). Besides the coffin of flat tiles, there were also others of curved plates.[1] Also clay chests for the dead (Fig. 428) and wooden coffins were in use. "If then the bones are carried away, then come cedar wood coffins of cypress wood, one for each community, and the bones of each one are in the coffin of his community", writes Pausanias.(II, 34).

But with the Greeks the clay coffin also takes the form of the rectangular house with gable roof and gables, as the last dwelling of the departed. The desire to decorate it led to painting the smooth clay surface. (Fig. 428 [2]). The earliest Grecian coffins in the form of the sarcophagus, later common, are the beautiful Klazomenian examples from the 6 th century, whose form is indeed not original in Greece, but was introduced. (Fig. 429).

Note 1. See Stuckelberg, O. M. V. Die Gräber der Hellenen in Altertum und Vorzeit. Berlin. 1888.

They likewise rise as great isolated monuments, cut from the solid rock, as a high square pillar on a pedestal, or as in L Lycia, cut as a sarcophagus, laso as imitations of dwellings, imitations of detached structures (Figs. 475 to 480), in the forms of chapels or temples. Wealthy houses or families had formal sepulchres built or cut in the rock, and they secured for themselves and theirs their own places in family tombs.

Luxury in these matters appears to have risen to a high point. For example, Demetrios Phalerus had to issue a decree to limit them, and accordingly in Attica a sepulchral stele could not rise more than 3 ells above the burial mound. (See examples in the Ceramicos in Athens). -- Fig. 479.

The bodies of the poorer classes were buried in the common burial place of their community; sepulchral columns perpetuated their names even there.

If the body of the deceased could not be obtained, then an empty grave in imitation of the actual one was prepared as a memorial. For the missing one, an empty cushioned bier was borne at the burial.

The corpse was placed in the clay coffin (cherameos soros), which was constructed of terra cotta in the form of a roof, and the use of which among the Athenians was regarded as a custom of their fatherland (Fig. 481). Besides the coffin of flat tiles, there were also others of curved plates .[1] Also clay chests for the dead (Fig. 482) and wooden coffins were in use. "If then the bones are carried away, then come carts with coffins of cypress wood, one for each community, and the bones of each one are in the coffin of his community", writes Thucydides.(II, 34).

But with the Greeks the clay coffin also takes the form of the rectangulah house with gable roof and gables, as the last dwelling of the departed. The desire to decorate it led to painting the smooth clay surface. (Fig. 488 [2]). The earliest Grecian coffins in the form of the sarcophagus , later common, are the beautiful Klazomenian examples from the 6 th century, whose form is indeed not original in Greece, but was introduced. (Fig. 483).

*Note 1. See Stackelberg, O. M. V. Die Gräber der Hellenen in Bildwerken und Vasengemälden. Berlin. 1838.*

*Note 2. Reproduced from Antike Denkmäler, pub. by Kais. Deutschen Arch. Inst. Vol. 1. Pl. 44. Berlin. 1891.*

Marble sarcophaguses relief ornament seem to first occur in Greece about the end of the 4 th century B.C. One of the oldest and most beautiful style is a sarcophagus with the combat of the Amazons now in Vienna. This is even excelled by the so-called sarcophaguses of the Macedonian kings of the Hellenic period found in Sidon. The latter were discovered in a common sepulchre (Fig. 484), placed in a separate chamber cut in the rock. Some of them have the highest art value. Of really thrilling beauty, of high dignity with wonderful invention and execution, in a sarcophagus with sorrowing women, that otherwise bears no marks of painting.(Fig. 485). Its angles are emphasized by by Ionic antes, between which are on the longer sides five, and on the ends two Ionic half columns of the most careful execution. In spite of the relatively small scale, no bead, no acanthus leaf, no volute band and no flute is forgotten, all being so skilfully, easily and limpidly wrought, with such noble and elegant proportions of the columns, that nothing appears little or labored. Between the columns are smooth enclosures extending to about one-third the height of the columns, before which are placed (2 × 6 + 2 × 3 = ) 18 female draped figures between the columns. No position or pose is repeated, and a special and interesting motive is found in each figure. With softly falling garments, bowed heads and f folded hands, a figure expresses the deepest emotions of sorrow and pain, like a precursor of the Mater Dolorosa of Renaissance art. One would almost believe himself standing before a work of the early Renaissance, so strongly, purely and seriously are the small figures conceived. On two other marble sarcophaguses, that exhibit no sculpture on the sides, the antique roof is imitated with wonderful accoracy. No ridge ornaments or acroterias are wanting there; the ridges bear palmations; the water spouts beneath the cyma are perforated; the lids are the most costly models of the Grecoan marble roof.On others are sculptured in the tympanum of the pediment a rider with prancing horse, or scrolls of leaves and flowers with round stems, scrolled and grooved, as on the cyma of the Leonidaon in Olympia, or on the Tholos in Epidauros. Everywhere

of the grace and beauty of Greek forms with high perfection in execution. The richest among the sarcophagus belongs to the type, where the external surfaces are decorated by figure reliefs, [illegible]

gens in Vienna already mentioned.

But what places the Sidonian especially high above all other known examples is their architectural treatment, which cannot be conceived more noble and characteristic. The smooth plinth forms the base, above which extends a member, as on the walls of the Erechtheion, consisting of round, scotia between two fillets, a smaller round, over this being an inverted lesbian cyma with beaded astragal, fillet and apophyge. The mouldings are ornamented in the richest manner by intertwining beast-leaves and heads, and they form a magnificent base for the sides adorned by friezes. The friezes are 1.72 ft. high and are worked in high relief, so that the feet and arms of some are entirely free from the background. The composition of the front side recalls in many ways the famous mosaic picture of the battle of Alexander in Naples. On the left of the spectator and on a tall horse, Alexander in flowing mantle and with levelled spear charges on the Persians, fallen into confusion, while on the right side a Macedonian general (Seleucus ?), with helmet on his head and in flowing mantle, hastens into the combat with a less animated movement. Alexander wears the head covering to be seen on his coins and appears spirited and self-[illegible]

Conceived in the momentum of the design and wonderfully are the battle executed; pain, scorn, and longing for death are remarkable expressed in the faces; the bodies of the infantry, one of whom strikes a knife into the neck of a prostrate man, are finely modeled. The rearing horses have a truth and animation, which recall a master like Lionardo. The combat extends over one end in the same compact manner, the other side and ends are decorated by just as beautiful and animated combat [illegible]

A cornice terminates the frieze friezes, that consists of a meander design, whose front surface is ornamented by a skilfully wrought first pattern, and of an echinus decorated and a pearl bead. These simple and noble architectural members, which

is the grace and beauty of Greek forms with high perfection in execution. The richest among the sarcophaguses belongs to the type, where the external surfaces are decorated by figure reliefs, battle or hunting scenes, as shown by the Amazon sarcophagus in Vienna already mentioned.

But what places the Sidonian especially high above all other known examples is their architectural treatment, which cannot be conceived more noble and characteristic. Its smooth plinth forms the base, above which extends a member, as on the walls of the Erechtheion, consisting of round, scotia between two f fillets, a smaller round, over this being an inverted Lesbian cyma with beaded astragal, fillet and apophyge. The mouldings are ornamented in the richest manner by interlacing heart-leaves and beads, and they form a magnificent base for the sides adorned by figures. The figures are 1.71 ft. high and are wrought in high relief, so that the feet and arms of some are entirely free from the background. The composition of the front side recalls in many ways the famous mosaic pictures of the battle of Alexander in Naples. On the left of the spectator and on a tall horse, Alexander in flowing mantle and with leveled spear charges on the Persians, fallen into confusion, while on the right side a Macedonian general (Perdiccas ?),with helmet on his head and in flowing mantle, hastens into the combat with a less animated movement. Alexander wears the head covering to be seen on his coins and appears spirited and warlike, while the countenance of Perdiccas looks grave and gllomy- Wonderful is the momement of the design and wonderfully are t the details executed; pain, scorn, and longing for death are remarkable expressed in the faces; the bodies of the infantry, one of whom strikes a knife into the neck of a prostrate man, are finely modeled. The rearing horses have a truth and animation, which recall a master like Lionardo. The combat extends over one end in the same compact manner, the other side and e end are decorated by just as beautiful and animated hunting scenes with equally perfect execution. (Figs. 486, 487).

A cornice terminates the figure frieze, that consists of a heavier geison, whose front surface is ornamented by a skilfully wrought fret pattern, and of an echinus decorated and a pearl bead. These simple and noble architectural members, which

enclose the wild ilucbustion of the battle and the hunt, contrasts by their isolation and quiet so little to make the figure composition appear even more animated. On this substructure rests the massive lid, whose vertical members meet accurately at the crowning cornice of the sarcophagus and consist of a low bas-relief with egee moulding and scotia, over these being a frieze decorated by vine scrolls (grapes with vine leaves) and an Ionic pattern with dentils. The latter are elaborately ornamented by ram's horns and female masks with conventional hair. On the angles of the pediments are sculptured four lions lying down, while fighting figures adorn the pediments, which are indeed rather small in scale. On the front appears a distinguished man, thrown down by soldiers, who surround him.

If this work, executed in the noblest fine-grained white marble, is exceedingly entrancing, we are further enchanted by the colors, what cover the sculptures and are in great part still well preserved. Helmets and weapons of the warriors are partly gilded, the mantles of Alexander and Perdiccas are violet purple, the hair is light brown, the eyes and lips are painted in the most careful and remarkable way; the reins and bits of the horses, the arrows sticking in the flesh of the animals, were wrought in bronze, according to the marks and ventures, and were then fixed in place; the vine scrolls of the frieze rise in gold on a ground of violet purple; the little figures of the pediments are not without color. On nude surfaces of figures, the bodies and faces, the marble is most carefully smoothed and it is further finished with a colorless wax polish. Thus the nude surfaces have the effect of a mild and no longer white brilliancy amid the gleam of the other colors, just as the human skin appears in reality. Therefore I could not subscribe to the statement of von Fren:-- [1] "I hold that a tonine of the nude surfaces by mere wax is excluded;" aside from the fact, that I judge the soft or too strong rosy colored flesh tone, erroneously imputed to so many antique sculptures, to be not exactly a happy addition, and in consideration of this circumstance, that various artists have been able to treat their work differently in regard to polychromy, and much may have been a later addition. The colored figures

enclose the wild fluctuation of the battle and the hunt, contribute by their isolation and quiet no little to make the figure composition appear even more animated. On this substructure rests the massive lid, whose vertical members meet accurately at the crowning cornice of the sarcophagus and consist of a low architrave with ogee moulding and scotia, over these being a frieze decorated by vine scholls (grapes with vine leaves) and an Ionic geison with dentils. The latter are alternately ornamented by ram's horns and female heads with radiating hair. On the angles of the pediments are sculptured four liony lying down, while fighting figures adorn the pedigents, which are indeed rather small in scale. On the front appears a distinguished man, thrown down by soldiers, who surround him.

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rise from a white ground and street distinguished and not gay in their colorie. A good and likewise practical contrast to the colors of the figures is produced by the gold violet frond trees hard of the lid and by the light and shade effects of the richly sculptured case, which has the effect of a grey or-nament raised on gray.[1]

Note 1. In Ebers. d. Kgis. Deutschen arch. Inst. Vol. 4. p. 24. Berlin. 1889.

Note 1 a. see Duru, J. Die Bemalung der Griechischen Vasen.

little white sanctuaries, not deep below the surface, where the dead were placed between stone slabs and dry limestone rocky were in use in Cnidiotonia. Tumulus and pit graves in the heroic period and the disclosure of the corpses therein have already been treated.

With the corpses were deposited copper utensils, vessels, and small clay figures, favorite animals, articles of clothing, ornaments, and even food (Fig. 222). "Everyone brings to his dead a gift, if he departed". (Theognidies).

The tombs cut in the precipices of the valley of the Kilia, with the vestibule and two columns between entrances at the entrance, are recalled by the tomb facades of Asia Minor, cut in the rock, [illegible] and which also suggest the erotic tombs in Rhodes, Cyrene, in Crete, Melos, Malos and Delos.

Conspicuous rows of columns and pires before the sepulchral chambers, that are placed beside each other, and for which are utilized inclined rocky places, are found in Cyrene, and also vestibules adorned by columns and pediment, as in Asia Minor. (Fig. 420).

Peculiar monuments without any claim to artistic development are these constructed in the 3rd or 4 th century B.C., the monumentes of blue marble, common on the island of Kasos, that

rise from a white ground and appear distinguished and not gay in their coloring. A good and likewise practical contrast to the colors of the figures is produced by the gold violet broad frieze band of the lid and by the light and shade effects of the richly sculptured base, which has the effect of a gray ornament painted on gray.[1]

*Note 1. In Jahrb. d. Kais. Deutschen Arch. Inst. Vol. 4. p. 24. Berlin. 1889.*

*Note 1 a. See Durm, J. Die Makedonischen Königssarkophage. Cent. d. Bauw. 1890. p. 329; also Rev. Arch. N. S. Vols. 10, 11; further, Amer. Jour. Archaeol. 1887. p. 97; lastly, Die antiken Sarkophagen-Reliefs in Auftrag d. Kais. Deutschen Arch. Inst. mit Benutzung der Vorarbeiten von F. Matz, har. u. bearb. von C. Robert. Vol. II. Mythologische Cyclen. Berlin. 1890.*

Simple stone sepulchres, not deep below the surface, where the dead were placed between stone slabs and dry limestone masonry were in use in Chilidromia. Tumulus and pit graves i in the heroic period and the placing of the corpses therein have already been treated.

With the corpse were deposited copper utensils, vessels, and small clay figures, favorite animals, articles of colthing, ornaments, and even food (Fig. 482). "Everyone brings to his dead a gift, if he desires". (Thucydides).

The tombs cut in the precipices of the valley of the Nile, with the vestibule and two columns between antes at the entrance, are recalled by the tomb facades of Asia Minor, cut in the rock, whose use depends on the natures of both countries, and which also suggest the grotto tombs in Rhodes, Cyprus, in Greece, on the north coast of Africa, in Nauplia and Syracuse, on Crete, Egina, Melos and Delos.

Goncinuous rows of columns and piers before the sepulchral chambers, that are placed beside each other, and for which are utilized inclined rocky slopes, are found in Cyrene, and also vestibules adorned by columns and pediment, as in Asia Minor. (Fig. 480).

Peculiar monuments without any claim to artistic development are those originating in the 3 rd or 4 th century B.C., the hemispheres of blue marble, common on the island of Kasos, that

have a diameter of 0.88 ft. with the name of the deceased cut on their smooth front surface.

Of more artistic importance than these primitive memorials are the columns (cippus). The Greeks semiloved memorial was developed to its greatest perfection in the Stele, i.e., a tall slab of stone set in the earth or fastened on a base, diminishes upward and terminating with a cornice; above this it had an extension cap in simpler materials and only painted, or in richer case consisting of sculptured lamentant scenes crowned with scrolls and palm leaves, motion helpers with the [illegible]

Note 1. See the beautiful and commemorative work: -- Die Ki-nesse Grabreliefs von A. Conze, published at the order of the Kais. Akad. d. Wissenschaften in Vienna. Vols. 1-8 et seq. Berlin. 1890-1900.

The front surface of the slab is usually further decorated by a magnificent seated figure in relief with the memorial inscription beneath and two sentimily mournt roseates above it. Figs. 4?6, 4?8).

After the 4 th century B.C., family scenes were preferred for the reliefs. Some of these represent the departure, the husband extending his hand to the wife and saying farewell, the father to his children, the wife to her husband and children; others are entirely without reference or purpose.

Note 2. Cippus imply by extending the land marks a stone of good wishes and friendship. (See Corpus Inscrs. Vol.).

A hydria beside such a figure, as frequently comes on the reliefs of these sepulchral steles, signifies in accordance with the Attic custom, that the person buried there died unmarried. For these unmarried persons, the hydria alone was adopted as a memorial, earlier in clay, later being much larger and carved in marble; it might likewise be decorated by sculptures, the same scene of the departure, as shown by numerous examples. (Fig. 4?8).

As sacred places, we find the tombs also decorated by fillets and garlands; formal gardens were also arranged around them in the later period.

Cippus was the preferred name for the memorial stone stands as a niche between antes or columns on right and left (architec-

have a diameter of 0.88 ft. with the name of the deceased cut on their smooth front surface.

Of more artistic importance than these primitive memorials are the columns (chiones). The Grecian sepulchral memorial was developed to its greatest perfection in the Stele, i.e., a tall slab of stone set in the earth or fastened on a base, diminished upward and terminating with a cornice; above this it had an anthemion cap in simpler materials and only painted, or in richer ones consisting of sculptured luxuriant acanthus ornament with scrolls and palm leaves, which belongs with the most beautiful creations of Grecian decorative sculpture. [1]

*Note 1. See the beautiful and comprehensive work: -- Die Attische Grabreliefs von A. Conze, published at the order of the Kais. Akad. d. Wissenschaften in Vienna. Vols. 1-3 et seq. Berlin. 1893-1900.*

The front surface of the slab is usually further decorated by a magnificent seated figure in sunken relief with the memorial inscription beneath and two skilfully wrought rosettes above it. Figs. 488, 489).

After the 4 th century B.C., family scenes were preferred for the reliefs. Some of these represent the departure, the husband extending his hand to the wife and saying farewell, the father to his children, the wife to her husband and children; others are entirely without reference or purpose. [2]

*Note 2. Others imply by extending the hand merely a token of good wishes and friendship.(See Comptes Rendus. 1861.).*

A hydria beside such a figure, as frequently occurs on the reliefs of these sepulchral steles, signifies in accordance with the Attic custom, that the person buried there died unmarried. For these unmarried persons, the hydria alone was adopted as a memorial, earlier in clay, later being much larger and carved in marble; it might likewise be decorated by sculptures, the same scene of the departure, as shown by numerous examples. (Fig. 489).

As sacred places, we find the tombs also decorated by fillets and garlands; formal gardens were also arranged around them in the later period.

Heroa was the preferred name for the memorial stone shaped as a niche between antes or columns on right and left (aedicu-

(sacrificial), between which were relieffs, and covered by an entablature and decorment. (Fig. 4001).

Portrait statues, if permissible in the being, were favorites in the Alexandrine and post-Alexandrine periods.

The tombs of family groups and kings were frequently distinguished particularly since their remains were often interred in the vicinity of sanctuaries, or in the temples themselves, there literally serve special tombs for them in the form of chapels and temples. Argos, the tribal hero of Arcadia, was buried at the river of the Temple of Hera at Tegnines, and Syrnos in the Temple of Demeter at Aigos; Euphanes' tomb was built in the form of a temple (see Valerius Maximus. VIII, 14); over Cassor's grave in Sparta stood a sanctuary built for him. Aside from the evidence of the writers, considerable remains of the temple-like tombs are preserved. They chiefly consist of a massive substructure, to which steps lead and which contained [illegible] substructure a small columnar structure with a gable roof or one in the form of a stepped pyramid.

Such figure ornament decorated the substructure as a frieze or was placed between the columns, as on the magnificent Persian-tomb (so-called monument of the Tarsis) near Xanthos in Lycia; groups of figures crowned the apex of the pediment or the roof, as for the monuments in Mylasa and Cnidos, or they surround a small cell structure, as in Xanthos and Halicarnassos, or as three-quarter columns ornamented the angles of a cell, as on the Tomb of Theron at Argos. The greatest sculptures in the Hellenistic and Roman Period [illegible] solus in Halicarnassos. "It was so extensive and so beautiful [illegible] it termed their one important sepulchral monuments mausoleums." (Pausanias. VI.I. 16).

The Xerxes Monument is now regarded as the Tomb of the Lycian prince or Persian satrap Harpagos, who took possession of the port of Telmissos about the 120th to Olympiad. On a high substructure decorated by two figures fighting extending around above each other, rose the bronze, an Ionic peripteral struct-

(aedicula), between which were reliefs, and covered by an entablature and pediment. (Fig. 490).

Portrait statues, if permissible in the heroa, were favorites in the Alexandrine and post-Alexandrine periods.

The tombs of family heroes and kings were reequently distinguished particularly; since their remains were often interred in the vicinity of sanctuaries, or in the temples themselves, there likewise arose special tombs for them in the form of chapels and temples. Arkas, the tribal hero of Arcadia, was buried at the altar of the Temple of Hera at Mantinea; and Pyrrhos in the Temple of Demeter at Argos; Amphiaros' tomb was built in the form of a temple (see Valerius Maximus. VIII, 16); over Castor's grave in Sparta stood a sanctuary built for him. Aside from the evidence of the writers, considerable remains of the temple-like tombs are preserved. They chiefly consist of a massive substructure, to which steps lead and which contains the sepulchre itself; over this rose in proportion to the substructure a small columnar structure with a gable roof or one in the form of a stepped pyramid.

Rich figure ornament decorated the substructure as a frieze or was placed between the columns, as on the magnificent Temple-Tomb (so-called Monument of the Nereids) near Xanthos in Lycia; groups of figures crowned the apex of the pediment or the platform of a pyramid. The columns either support merely the roof, as for the monuments in Mylassa and Cirta, or they surround a small cell structure, as in Xanthos and Halicarnassos, or as three-quarter columns ornamented the angles of a cell, as on the Tomb of Theron at Akragas. The greatest astonishment in the ancient world was aroused by the Tomb of Mausolus in Halicarnassos. "It was so extensive and so beautiful in execution, that even the Romans were amazed at it and from it termed their own important sepulchral monuments mausoleums." (Pausanias. VII. 16).

The Nereid Monument is now regarded as the Tomb of the Lycian prince or Persian satrap Pericles, who took possession of the port of Telmissos about the 102 nd Olympiad. On a high substructure decorated by two figure friezes extending around above each other, rose the hieron, an Ionic peripteral struct-

structure of 4 × 3 columns with a vaulted roof and entrance between arches, were to obtain space for the doorways, the Doric columns are crowded back close to the arches. The architrave consisted of an architrave ornamented by reliefs and a cornice with dentils. The frieze was marble, as in Ionian fashion of towns. Around the walls of the cell ran a frieze 1.41 m. [illegible] at the arches and walls of the pediment. Four marble lions [illegible] the corners of the podium stood the Nereid figures, to which the monument owes its name. (Pls. 4-11). Everything remaining of the sculptures executed in Parian marble was brought to the British Museum in London.

The [illegible], was the Persian [illegible], and placed on the soil of Asia Minor for himself and the satrap-wide satrapies, lasted at about the middle of the 4 th century B.C. all the most important Greeian artists of that time. (See Pliny, 36, 30, 31). Scopas and Praxis[1] are mentioned [illegible] Pythis, Pythios and Lycaeus. The building still stood in good preservation in the 12 th century A.D. in the Eastern Coast, until an earthquake easily overthrew it, and it was at last entirely destroyed by the Knights of St. John (1402 and 1522). In 1846, 42 relief slabs of the monument were found and taken to London; later in 1856, excavations under the direction of Newton brought to light numerous remains of architectural remains and of sculptures.

Note 1. See Brunn. Vol. II, p. 252, 254. (Pythis, Pythios, Lycaeus, Pythios).

Pliny gives the height of the monument as 140 ft. and the [illegible] the building were about 9 ft. in height. Portions of more than 50 marble lions were found; also the richly fated torso of a mounted amazon is to be here mentioned. The relief's were [illegible], and the frieze slabs likewise consisted of kinds of marble of different colors.

On a high substructure rose a cell surrounded on four sides

structure of 4 × 6 columns with a double cell and entrance between antes, where to obtain space for the doorways, the Ionic columns are crowded back close to the antes. The entablature consisted of an architrave ornamented by reliefs and a cornice with dentils. The frieze was wanting, as in Lycian facades of tombs. Around the walls of the cell extended a frieze 1.41 ft. high and high reliefs decorated the pediments with statuettes at the apexes and angles of the pediment. Four marble lions guarded the entrance to the cell, and in the intervals between the columns of the portico stood the Nereid figures, to which the monument owes its name.(Fig. 491). Everything remaining of the sculptures executed in Parian marble was brought to the British Museum in London.

The tomb mentioned, that the Persian satrap, king Mausolus, had placed on the soil of Asia Minor for himself and his sister-wife Artemesia, busied at about the middle of the 4 th century B.C. all the most important Grecian artists of that time. (See Pliny, 36, 30, 31). Satyros and Pythis [1] are mentioned as architects; the sculptured ornamentation was entrusted to Scopas, Bryaxis, Timotheos and Leochares. The building still stood in good preservation in the 12 th century A.D. in the Carian port, until an earthquake partly overthrew it, and it was at last entirely destroyed by the Knights of St. John (1402 and 1522). In 1846, 43 relief slabs of the monument were found and taken to London; later in 1856, excavations under the direction of Newton brought to light numerous remains of architectural remains and of sculptures.

*Note 1. See Brunn. Vol. II, p. 253, 254. (Pythis, Phythios, Phiteus, Phileos).*

Pliny gives the height of the monument as 140 ft. and its perimeter as 440 ft, including the quadriga standing on the summit platform. Judging from the fragments, the statues of the building were about 8 ft. in height. Portions of more than 20 marble lions were found; also the highly famed torso of a mounted amazon is to be here mentioned. The reliefs were painted, and the facing slabs likewise consisted of kinds of marble of different colors.

On a high substructure rose a cell surrounded on four sides

by Ionic columns. The columns, 9 in front and 11 in depth, are moderately slender, slightly diminished, and fluted by 24 flutes. The base has a bold torus above two scotias connected by astragals. The volutes of the capitals are small; a reading member does not remain. The architrave is divided in three bands; the frieze is decorated by figure reliefs, and the cornice is enriched by dentils; the eyes commended by antiquarian connoisseurs and Irons' books. Above the cornice rose a marble pyramid in 24 steps, on whose climax stood the statue of the king and his sister with the quadrigas. Traces of color were also discovered here on some fragments.

The Mausoleum has inspired archaeologists and architects like no other monument. The materials for a restoration are lacking. Some fragments (three lions) are preserved by the Imperial Museum at Constantinople, but most are in the British Museum in London. (See the enumeration of his pieces there in the [illegible] Sculpture [illegible]

[illegible] pieces represented by fragments in the British Museum, by P. Ferguson. II. London. 1800). One suggested point is the arrangement of the architecture. Did a figure frieze exist or was it wanting, since none such was found in Pirene? The original blocks available in the current Museum suggest only lightly for me, and incline top the following reasons:-- an architecture without frieze, according to the return on the architrave pieces, which forms the uppermost tacia, would assume two equally large egg-and-dart mouldings above each other, that does not look very well on the upper moulding of the substructure of the Xerxes monument. Still less advantageous must be the effect of this arrangement, when the unusually projecting cornice rests directly on the architrave. This is 2.25 ft. high and according to the original blocks, its projection beyond the upper face of the architrave amounts to fully 2.88 ft. The architrave would already be shaded for a not very high position of the sun, and the eave cornice would be crushing on the lower parts. Only the position of a frieze makes this projection supportable, that is assumed too small in the recent restorations, contrary to the original block in London. (Fig. 318). Of many older and later restorations, only that of Pullmann

by Ionic columns. The columns, 9 in front and 11 in depth, were moderately slender, slightly diminished, and surrounded by 24 flutes. The base has a bold torus above twio scotias connected by astragals. The volutes of the capitals are small; a necking member does not remain. The architrave is divided in three bands; the frieze is decorated by figure reliefs, and the cornice is enriched by dentils; the cyma was ornamented by anthemion ornaments and lions' heads. Above the cornice rose a marble pyramid in 24 steps, on whose platform stood the statue of the king and his sister with the quadriga. Traces of color were also discovered here on some fragments.

The Mausoleum has busied archaeologists and architects like no other monument. The materials for a restoration are lacking. Some fragments (three lions) are presented by the Imperial Museum at Konstantinople, but most are in the British Museum in London. (See the enumeration of the pieces there in the little illustrated Catalogue. London. 1900; also Greek Buildings represented by fragments in the British Museum, by W. R. Lethaby. II. London. 1900). One contested point is the arrangement of the entablature. Did a figure frieze exist or was it wanting, since none such was found in Priene? The original finds exhibited in the British Museum suggest one; justly for me, and indeed for the following reasons:-- an entablature without frieze, according to the return on the architrave piece, which forms the uppermost facia, would assume two equally large egg-and-dart mouldings above each other, that does not look v very well on the upper moulding of the substructure of the Nereid Monument. Still less advantageous must be the effect of this arrangement, when the unusually projecting cornice rests directly on the architrave. This is 2.88 ft. high and according to the original blocks, its projection beyond the upper fascia of the architrave amounts to fully 3.33 ft. The architrave would already be shaded for a not very high position of t the sun, and the eave cornice would be crushing on the lower parts. Only the addition of a frieze makes this projection supportable, that is assumed too small in the recent restorations, contrary to the original block in London.(Fig. 316).

Of many older and later restorations, only that of Bühlmann

in Jaeger (1909) whose use building without a frieze. Pros- of Sullivan (1887) (Fig. 4b8), Ferguson (1890), Peterson (1897), [illegible] van Alder (1890) (Fig. 4b9), all prefer the figure frieze. Of those mentioned, only the designs of Sernter, Böhlmann and Adler are considered, which have a certain similarity in spirit. The statues on the substructure are shown with more talent by Böhlmann, but are rather dry in Adler's drawing. The arrangement of the stepped structure in two divisions, as preferred by Böhlmann and also by Sernter, is a happy and skillfully used idea. The stepped structure becomes technically possible, the composition is freer and bolder in its elevation, and the step- per pyramid is more permissible, whose form is most poorly imag- ined in the design of Gockerell. The carrying up of the steps by curves in a concave curved line, as done on the conical roof of the Tomb of Arsaces and on some commended tombs in Asphalis, would hardly indicate great facility.

It is worse for the attempts at the restoration of the intel- ior, they are all neither esthetically nor scientifically accepta- ble, based had or technically impossible.

Notable is the connection of the steps by clamps (Fig. 10a), which I give in accordance with the original fines in the Pitt- ish Museum, and which are alone correct from a photograph in the Essay of W. S. Dinsmoor in the Anti-dome berbe of the Ar- chaeol. Inst. of America. Vol. 12. (1908). But his attempt to restore the ceiling of the cell is Barocco, on the other hand, for comparison are reproduced the two attempts of Adler and of Böhlmann in Figs. 4b8 and 4b9, to treat the exterior of the superstructure in accordance with the traditions.

In the same necessary or monuments with stepped pyramids also is included the so-called Tomb of Pator near Abydos, the lion monument near Cnidos, but especially the Tomb at Mal- asse. In this the portico rises above a bold square substruc- ture, on which an entrance leads into the interior, whose sloped ceiling is supported by four plain piers. On the superst- ructure of four simple piers, between which on each side stand two peculiarly coupled half columns, support the architrave with the frieze of case form, over which rose a richly decora- ted stepped stone ceiling in the manner of a stepped pyramid.

in Munich (1909) shows the building without a frieze. Those of Pullan (1862) (Fig. 493), Fergusson (1862), Petersen (1867), Bernier (1892), Oldfield (1895), Arnold (1896), Stevenson (1896), and Adler (1899) (Fig. 492), all prefer the figure frieze. Of those mentioned, only the designs of Bernier, Bühlmann and Adler are considered, which have a certain similarity in spirit. The statues on the substructure are shown with more talent by Bühlmann, but are rather dry in Adler's drawing. The arrangement of the stepped structure in two divisions, as preferred by Bühlmann and also by Bernier, is a happy and skilfully used idea. The stepped structure becomes technically possible, the composition is freer and nobler in its elevation, and the stepped pyramid is more permissible, whose form is most poorly handled in the design of Cockerell. The carrying up of the steps by others in a concave curved line, as done on the conical roof of the Tomb of Absalom and on some monumental tombs in Aquileia, would hardly indicate great facility.

It is worse for the attempts at the restoration of the interior, they are all neither esthetically nor statically acceptable, beind bad or technically impossible.

Notable is the connection of the steps by clamps (Fig. 104), which I give in accordance with the original finds in the British Museum, and which are alone correct from a photograph in the Essay of W. B. Dinsmoor in the April-June parts of the Archaeol. Inst. of America. Vol. 12. (1908). But his attempt to restore the ceiling of the cell is Barocco, on the other hand. For comparison are reproduced the two attempts of Adler and of Bühlmann in Figs. 492 and 493, to treat the exterior of the superstructure in accordance with the traditions.

In the same category of monuments with stepped pyramids should also be included the so-called Tomb of Theron near Akragas, the Lion Monument near Cnidos, but especially the Tomb at Mylassa. In this the portico rises above a bold square substructure, on which an entrance leads into the interior, whose stone beam ceiling is supported by four plain piers. On the superstructure of four angle piers, between which on each side stand two peculiarly coupled half columns, support the architrave with the frieze of ogee form, over which rose a richly decorated stepped stone ceiling in the manner of a stepped pyramid,

counterpoised by corbelling. Both columns are plain for two-thirds their height, and they exhibit the form of capital in execution still more correct than at the Tower of the Winds, that was found in the Theatre of Dionysos in Athens.

If the interpretation of the Tower be correct, we have in the court of the recently discovered Council House in Miletus also to do with the interesting example of a "Tomb of Honor", that is characterized by a foundation 24.0 ft. long and 22.75 ft. wide, of limestone slabs with iron clamp bonds in cast lead. According to the fragments found, on this rose in the midst of the Sanctuarion surrounded by porticos on three sides, a structure reproduced in fig. 124 after the drawings of F. K. Dörpfeld, [illegible] adorned with fascias rose the external walls, divided into panels by Corinthian columns set before them, and which were decorated by representations in relief. Above was a normal Corinthian entablature, consisting of architrave, frieze and main cornice.

It is assumed that this building further supported an attic (acroteria ?), but whose existence and shape is only approximately proved by ruins. The date of its erection is later than that of the encircling Council House with its porticos, which belong to the 2 nd century B.C. It is believed, that the pieces found should be recognized as portions of a Tomb of Honor, that dates from the time of the Roman supremacy. This would agree with the place of its location.

On account of the great number and of their different form and construction, the Syracusan rock-cut tombs are especially remarkable. By them we can follow the observing nature of Hellenism from the darkness of the closest of Sicilian period through [illegible] an ruin and finally to the Christian catacombs. [1]

The Cretan tombs have found success as grotto tombs, and in them constantly occur the characteristic memorial, the separate [illegible] in the rock, constructed of slabs, or may be sarcophagus of terra cotta or of marble. The loculi were always covered by

constructed by corbelling. Both columns and piers are fluted for two-thirds their height, and they exhibit the form of capital in execution still more corrupt than at the Tower of the Winds, that was found in the Theatre of Dionysos in Athens.

If the interpretation of the finder be proper, we have in the court of the recently discowered Council House in Miletus also to do with the interesting example of a "Tomb of Honor". That is characterized by a foundation 31.0 ft. long and 23.75 ft. wide, of limestone slabs with iron clamp bonds in cast lead. According to the fragments found, on this rose in the midst of the Bubeuterion surrounded by porticos on three sides, a structure reproduced in Fig. 494 after the drawings of H. K Knackfuss. (Das Rathaus in Milet. Berlin. 1908). On a base adorned with festoons rose the external walls, divided into panels by Corinthian columns set before them, and which were decorated by representations in relief. Above was a normal Corinthian entablature, consisting of architrave, frieze and main cornice.

It is assumed that this building further supported an attic (sarcophagus ?), but whose existence and shape is only approximately proved by finds. The date of its erection is later than that of the enclosing Council House with its porticos, which belong to the 2 nd century B.C. It is believed, that the pieces found should be recognized as portions of a Tomb of Honor, that dates from the time of the Roman supremacy. This would agree with the place of its location.

On account of the great number and of their different form and construction, the Syracusan rock-cut tombs are especially remarkable. "By them we can follow the changing nature of burial from the darkness of the oldest or Sicelian period through the centuries of the Grecian period until the time of the Roman rule and finally to the Christian catacombs. [1]

*Note 1. See Holm-Cavallari. p. 310-327.*

The Grecian tombs there found appear as grotto tombs, and in them constantly occur the characteristic memorial, the separate receptacles for the bodies (loculi), which may be cut in the rock, constructed of slabs, or may be sarcophaguses of terra cotta or of marble. The loculi were always covered by

slab and their bottoms were sometimes perforated, to permit the escape of the fluid resulting from the decomposition of the corpse to a lower cavity. Such sarcophagi are likewise the flat recesses above the Isouli (Fig. 4b5), where is shown a perfectly developed semicircular chamber of the sixth dynasty the Lebons of Paradise and of S. Vehemes.

As an interesting example of an architecturally treated tomb may be taken fig. 4b4, designated as the Tomb of Pronimedes, a comb chamber of moderate size, whose plan forms an irregular rectangle, and whose entrance aisle is decorated by Doric architrave cut from the rock at a small scale. On two half columns flanking triples with a pediment enclosed by a cyma. The front wall between the columns, in which was the entrance doorway, is now destroyed. The space in the interior served for the deposition or entire bodies or the reception of boxes or sarcophagi. (Compare the great niche on the right of the entrance for entire bodies, the five sarcophagi of the rear wall and the tomb of the left side, behind whose fronts were preserved the remains or bodies. The holes in the floor contained boxes and ordinary dummy bones)

A monument of peculiar arrangement is found in the Barcon of Grimscob-Taves. Walls of 16.00 to 21.0 ft. high enclose in rectangular form a terrace on the slope of the mountain (64.5 × 80.5 × 27.5 × 77.0 ft.), to which a single doorway (4.00 × 7.05 ft.) on the least side affords access. The walls are mostly covered with trapezoidal sabiers, and the two upper courses are decorated by relief sculptures inside and outside, which are terminated by a plain cornice cornice, crowned by an ass-and-dart moulding. The high external fluted of the doorway supports four strongly projecting wicked bulls' heads; the jambs on the inside each support an almost life size figure of a dancer in a niche; little figures of musicians crowned the lintel. In the interior stands obliquely to the wall one of the well known Lycian sarcophaguses, that imitated a wooden hut. Outside the walls stand three others, two of which have the form of the wooden hut with gable roof and widely projecting gable, the third having a pointed-arched roof. The

slabs and their bottoms were sometimes perforated, to permit the escape of the fluid resulting from the decomposition of the corpse to a lower cavity. Just as characteristic are likewise the flat recesses above the loculi (Fig. 495), where is shown a perfectly developed sepulchral chamber of the street between the Latomia of Paradiese and of S. Venera.

As an interesting example of an architecturally treated tomb may be taken Fig. 496, designated as the Tomb of Archimedes, a tomb chamber of moderate size, whose plan forms an irregular rectangle, and whose entrance side is decorated by Doric architecture cut from the rock at a small scale. On two half columns rests a complete Doric entablature with architrave and triglyph frieze with a pediment enclosed by a cyma. The front wall between the columns, in which was the entrance doorway, is now destroyed. The space in the interior served for the deposition of entire bodies or the reception of bones or ashes. (Compare the great niche on the right of the entrance for entire bodies, the five arcosolias of the rear wall and the four of the left side, behind whose fronts were preserved the remains of bodies. The holes in the floor contained bones and ordinary Roman urns).

A monument of peculiar arrangement is found in the Heroon of Giolbaschi-Trysa. Walls of 12.48 to 21.0 ft. high enclose in rectangular form a terrace on the slope of the mountain (64.5 × 80.5 × 67.8 × 77.0 ft.), to which a single doorway (4.04 × 7.05 ft.) on the least side affords access. The walls are mostly coursed with trapezoidal ashlars, and the two upper courses are decorated by relief sculptures inside and outside, which are terminated by a plain crowning cornice, ornamented by an egg-and-dart moulding. The high external lintel of the doorway supports four strongly projecting winged bulls' heads; the jambs on the inside each support an almost life size figure of a dancer in a niche; little figures of musicians ornament the lintel. In the interior stands obliquely to the wall one of the well known Lycian sarcophaguses, that imitated a wooden hut. Outside the walls stand three others, two of which have the form of the wooden hut with gable roof and widely projecting gable, the theird having a pointed-arched roof. The

latter is about 14.4 ft. high, while the others have heights of 9.50 and 14.1 ft. The very interesting reliefs on the external south wall represent combats of amazons and centaurs, the war of the seven against Thebes, a leading female on the internal south wall are a beast, guardian of the fourth feminine, the slaughter of the suitors, and the hunt of Meleager; on the internal north wall are the robbery of Leukippides, a hunt and the combat of centaurs; on the internal west wall are the battle between the Achaeans and Troy: the storming of Troy, Achilles and the Amazons; on the internal east wall are combats of Greeks, deeds of Theseus, and a feast.[1] (Fig. 497, 498. Now a show piece of the Louvre. Musée in Vienne).

Note 1. See Hamdorf & Niemann. Das Heroon Gjölbaschi-Trysa. Wien. 1. Romaia. Xanthi. a. Oest. Jahr. 1899-1900.

The Royal Tombs at Cyrenaica are likewise peculiar. Near the Tomb of Sheshonk and above a subterranean sepulchral chamber rises a stone tumulus of about 40. ft. diameter, around which are three sculptures, supported by pairs of columns, which are so placed at the foot of the hill as to have on the plan the aspect of an intermediate architrave. The bases of columns are of the Doric order of the later period, each being composed of 7 drums and resting on square plinths; they are connected by plain architraves, on which stand isolated figures. (Two eagles and one male and one female figure, seated beside each column).

Another tomb near Ras-Sun shows columns in threes in the same arrangement, but which are not joined by a common architrave, each separately supporting on the abacus of the central a seated lion and a relief slab with figures. (Fig. 499).

At a third tomb and at the foot of a tumulus about 492.2 ft. diameter, three terraces are built, that support figures of sphinxes and of gods, built in 7 to 8 courses of stone to a height of 22.8 ft., and then constructed; seated colossal figures with relief slabs, lions and eagles alternate. The location that last mentioned is widely visible, being placed on the Ras-Sun-Tagh, 2000 ft. high.[2]

Note 2. See Antiquités du Bosphore Cimmérien concernant le Musée Impérial de l'Ermitage. St. Petersburg. 1854. 2 vols.

latter is almost 1-.4 ft. high, while the others have heights of 9.85 and 13.1 ft. The very interesting reliefs on the external south wall represent combats of amazons and centaurs, the war of the seven against Thebes, a landing battle; on the internal south wall are a feast, quadriga of the founder Bellerophon, the slaughter of the suitors, and the hunt of Meleager; on the internal north wall are the robbery of Leukippides, a hunt and the combat of centaurs; on the internal west wall are the battle between the shipyard and Troy; the storming of Troy, Achilles and the Amazons; on the internal east wall are combats of Antaeus, deeds of Theseus, and a feast.[1] (Figs.497, 498. Now a show piece of the Austrian Museum in Vienna).

*Note 1. See Benndorf & Niemann. Das Heroon Giolbashi-Trusa. Jahrb. d. Kunsth. Samml. d. Oest. Kais. 1889-1891.*

The Royal Tombs at Commagene are likewise peculiar. Near the Tomb of Sheshonk and above a subterranean sepulchral chamber rises a stone tumulus of about 410. ft. diameter, around which are three sculptures, supported by pairs of columns, which are so placed at the foot of the hill as to mark on the plan the angles of an approximate equilateral triangle. The pairs of columns are of the Doric order of the later period, each being composed of 7 drums and resting on square plinths; they are connected by plain architraves, on which stand isolated figures. (Two eagles and one male and one female figure, seated beside each other).

Another tomb near Kara-Kush shows columns in threes in the same arrangement, but which are not joined by a common architrave, each separately supporting on the abacus of the capital a seated lion and a relief slab with figures. (Fig. 499).

At a third tomb and at the foot of a tumulus about 459.2 ft. diameter, three terraces are built, that support figures of ancestors and of gods, built in 7 to 8 courses of stone to a height of 32.8 ft., and then sculptured; seated colossal figures with relief slabs, lions and eagles alternate. The location on the high top of a mountain is common to all these tombs. That last mentioned is widely visible, being placed on the Nemrud-Dagh, 6500 ft. high.[2]

*Note 2. See Antiquites du Bosphor Cimmerien conservees au Musee Imperial de l'Eremitage. St. Petersburg. 1854. 3 vols.*

[illegible] . [illegible]
[illegible]
ness.

The tumulus of the heroic period again returns and covers its shadow on Greek art at its end, just as on its beginning!

Finally should also be mentioned the wooden sarcophagus, ornamented with caryatids, figures, patterns and gilding, made of carved slabs and marquetry work, with reduced to its technical and art-industrial essentials, which was placed in semicircular chambers of masonry. They are chiefly composed of four boards, two for the sides and two for the ends-- long rectangular chests -- with carved or painted ornament on a white or gray ground. Cedar, box, cypress and yew appeared to be material. The bodies usually lying in the Grimes contained the funeral materials of this kind, that were brought to the burial place in st. Petersburg; similar items were found in the Greeks cemetery near Abusir.

The objects from Fayoum (Hawara-Kahun) are unique of their kind and indeed exhibit the oldest works in joinery and marquetry, that exist in this war in the world. Their ornaments and figures indicate the 4 th century B.C. Thin veneers of boxwood, like the Etruscan vases, exhibit incised representations of figures in the highest perfection; gilded cornices in relief, perforated crenaerts, eyes of green or red glass in the volutes of Ionic capitals etc. This older wooden furniture shows the same architectural forms as the great stone sarcophagus (moss shape and mode of decoration were indeed transferred from the wooden sarcophagus).

Waterhouse collects a great number of such from Fayoum, that exhibit external walls adorned by pilasters, half and entire columns of the Ionic and Corinthian orders. Fe likewise more frequently find the capitals composed of a different material, for example of ebonoo. Decorated ornamental tombs (egg-and-dart mouldings) are mostly encountered in tougher and harder woods than the other parts. Above the cornices also occur small turned balusters already in this early period of the art industries.

With the most beautiful and richest piece is indeed to be recognized that obtained by Waterhouse under No. 88, page 5c.

*folio. Also C. Watzinger. Griechische Holzsarcophage. Leipzig. 1905.*

The tumulus of the heroic period again returns and casts its shadow on Grecian art at its end, just as on its beginning!

Finally should also be mentioned the wooden sarcophagus, ornamented with carvings, figures, painting and gilding, inlays of colored glass and marquetry work, with regard to its technical and art-industrial peculiarities, which was placed in sepulchral chambers of masonry. They are chiefly composed of four boards, two for the sides and two for the ends-- long rectangular chasts -- with carved or painted ornament on a white or gray ground. Cedar, box, cypress and yew supplied t the material. The tombs near Kertch in the Crimea contained the richest materials of this kind, that were brought to the Hermitage in St. Petersburg; simpler forms were found in the Grecian cemetery near Abousir.

The objects from Kertch (Pantikapaeon) are unique of their kind and indeed exhibit the oldest works in joinery and marquetry, that exist in this way in the world. Their ornaments and figures indicate the 4 th century B.C. Thin veneers of boxwood, like the Etruscan mirrors, exhibit incised representations of figures in the highest perfection; gilded carvings in relief, perforated ornaments, eyes of green or red glass in the volutes of Ionic capitals etc. This older wooden furniture shows the same architectural forms as the great stone sarcophaguses (whose shape and mode of decoration were indeed transferred from the wooden sarcophaguses).

Watzinger collects a great number of such from Kertch, that exhibit external walls adorned by pilasters, half and entire columns of the Ionic and Corinthian orders. We likewise more frequently find the capitals composed of a different material, for example of stucco. Decorated ornamental bands (egg-and-d dart mouldings) are mostly executed in tougher and harder woods than the other parts. Above the cornices also occur small turned balusters already in this early period of the art industries.

With the most beautiful and richest pieces is indeed to be recknoned that published by Watzinger under No. 35, page 55,

with its latticed balustrades and colonnades, the little Niobe figures being in plaster; then that published in the splendid Russian work mentioned with its singular ornamentation recalling metopes and triglyphs.(Fig. 500).

A simpler and smaller original wooden sarcophagus is to be found in the collection of the Archaeological Institute of the University of Heidelberg, and another example from Kertch is in the Berlin Antiquarium. (No. 29 in Watzinger).

How far the art of joinery had advanced in these products and what connections were employed therein, evidence is given in Fig. 501, after Watzinger, a collection of joints in woodwork. Even today, we have nothing much better to show!

Closing Words.

The question is frequently asked today in artist circles; Wherefore the study, the research in architectural forms and constructions of ages long past, even if they are so beautiful in themselves, but originated under different conditions? Here is the answer, embodying an expression of Viollet-le-Duc.

Whatever has been done before you, that should you not ignorantly pass by; it is public broperty, an inherited possession, whose greatness and value one must know.

But add thereto, whatever you may from your own genius, collect together all thy power of thought -- but obey the demands of the time!

THE END.

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